



***NORFOLK DISTRICT***

***TECHINICAL SERVICES DIVISION***

***QUALITY MANAGEMENT PLAN***

***APRIL 2001***

**NORFOLK DISTRICT  
QUALITY MANAGEMENT PLAN  
(DRAFT)**

1. Purpose: This plan provides the general policy, responsibilities and procedures for the execution of quality management activities within the Norfolk District (CENAO).

2. Applicability: This plan applies to all technical products and activities of CENAO within its responsibilities for Civil Works, Military, and Support for Others Projects. Quality begins at the project's planning phase and continues through it's design, construction, and operation phases.

3. References:

- a. Engineer Regulation XXXXXXXX, Quality Management.
- b. Engineer Regulation 5-1-11, Program and Project Management.
- c. Engineering Branch Design Guide
- d. NAD Memorandum, XXXXXXXX Implementation of DrChecks

4. Definitions:

- a. Customer: The owner, client, local sponsor, user or beneficiary of a service or product.
- b. Contractor/Consultant: Personnel resources necessary to accomplish work other than in-house local District forces, such as other Corps offices, other government agencies or private contractors.
- c. Design Checks and Other Internal Review Processes: Detailed review and checking which must be carried out as routine management practices in each of the respective functional elements. Such review includes checking basic assumptions and calculations. These checks are performed by senior technical staff responsible for the work, such as supervisors and work leaders, and shall be performed prior to independent technical reviews.
- d. Decision Documents: A decision document is any report prepared for the purpose of obtaining project authorization or modification, commitment of Federal funds for project implementation, and approval to spend/receive funds as a result of entering into agreements with other agencies or organizations including those to obtain Congressional authorization.

e. Functional Chiefs: For the purposes of this plan, these are the chiefs of the functional elements within the Technical Services Division (Planning, Engineering, Regulatory, Construction, and Operations), as well as Programs and Project Management Division (Environmental/SFO, Military and Civil).

f. Implementation of DrChecks: For all technical products DrChecks automated review management software shall be used for the compilation and dissemination of product review comments.

g. Independent Technical Review (ITR): A review by a qualified person or team, not affiliated with the development of a project/product for the purpose of confirming the proper application of clearly established criteria, regulations, laws, codes, principles and professional procedures.

h. Not Used

i. Project: Any work (projects, studies, products, services, etc) intended to produce a specific outcome or solution to a customer problem or need.

j. Project Delivery Team (PDT): A team of multi-disciplined professional and non-professionals assembled by the Project Manager responsible for delivering the project within budget, time and quality expectations as defined in the Project Management Plan.

k. Project Manager (PM): The designated project team leader and single-point-of-contact between the customer and the Corps. The PM leads a multi-disciplined project team with responsibility for assuring that the project stays focused on the customer's needs and that all work is integrated and done in accordance with a Project Management Plan. Each project shall have a single PM to ensure single point accountability for the project.

l. Project Management Plan (PMP): The detailed, specific plan, used to manage and control the delivery of a project/study/product/service from inception to completion. The PMP shall be developed by the PM with input and information from the various PDT members.

m. Quality Assurance (QA): The process that provides oversight of an contractor or consultant's quality control processes to assure their effectiveness in the production and delivery of quality products and services.

n. Quality Assurance Plan (QAP): A written document describing activities that will be accomplished to assure the effectiveness of quality control processes.

o. Quality Assessment Audit (QAA): A periodic audit of district quality assurance processes and how those processes affect the quality of products and services.

p. Quality Control (QC): The processes used to assure performance meets agreed upon customer requirements which are consistent with law, regulations, policies, sound technical criteria, schedules, and budget. Quality Control consists of a multitude of processes and procedures to ensure quality products are produced. It begins with the selection of a highly qualified PM and a technically capable project delivery team (PDT), the preparation of a Quality Control Plan, appropriate supervisory guidance, and continuous/seamless independent review. One of the more visible processes is an Independent Technical Review (ITR).

q. Quality Control Plan (QCP): A written plan prepared for each project or project phase which establishes the agreed upon requirements of the customer, identifies the Independent Technical Review Team (ITRT) including technical area of responsibility for each member and its responsibilities, and the procedures that will be employed to ensure compliance with appropriate laws, regulations, policies and technical criteria.

r. Quality Management Plan (QMP): A plan specific to an organization that states the management policies and business procedures to assure the quality of products and services.

s. Seamless Review: In-progress reviews made by members of the review team during product preparation.

t. Support for Others (SFO): Projects for customers outside of the Department of Defense.

u. Technical Team Leader: The individual from the product producing organization designated as the Technical Lead. For Engineering Branch this individual shall be identified as the Project Engineer/Project Architect.

v. Technical Products: All deliverables are referred to as technical products, including decision and implementation documents as well as studies, reports, plans and specifications and any other documents or graphically solutions that include the integration of technical products from multiple functional elements. They include completed deliverables that are ready for transmission to other members of the project delivery team, outside of the element that performed the work.

w. Technical Review: Technical Review is the focus on compliance with established policy, principles and procedures using clearly justified and valid assumptions. It includes the verification of assumptions, methods, procedures, and material used in analyses based on the level of complexity of the analysis. It verifies the alternatives evaluated, appropriateness of data used and level of data obtained, functionality of the product and verifies the reasonableness of the results including whether the product meets the customers needs consistent with law and existing policy and engineering and scientific principles.

## 5. District Quality Management Policy:

a. It is the policy of the Norfolk District to develop, integrate, and implement quality management practices including QA and QC to assure delivery of quality products and services that meet customer needs and expectations in accordance with applicable laws, policies and technical criteria, schedules, and budgets. Adherence to quality principles and established QA and QC practices are integral with the roles and responsibilities of all district functions.

b. Districts have overall responsibility for QC. The division has responsibility for QA.

(1) QC will be performed by the organization executing the work, i.e., the district or contractor working for the district.

(2) QA will be performed in accordance with the following:

- (a) In-house work - QA will be ensured by the division office;
- (b) Contractor/Consultant work - QA will be performed by the district office, subject to division office oversight.

c. The Program and Project Management Business Process (PMBP), as outlined in reference 3b., is the corporate management approach for execution of all Norfolk District programs and projects. This approach is governed by the following principles:

(1) Quality products are produced by empowering customer driven, qualified teams supported by all necessary resources.

(2) The Project Review Board (PRB) is responsible for the gross oversight of the district quality management processes.

(3) The DDE-PM shall chair the PRB. The PRB shall oversee all quality management processes and ensure corporate success in delivering quality projects within time and budget requirements by empowering Project Delivery Teams.

(4) The Project Manager (PM), the Functional Chiefs, and the members of the Project Delivery Team (PDT) have a shared responsibility for project quality.

(5) The Functional Chief is responsible for product quality, his/her portion of the district quality management process, and for ensuring the PM has appropriate resources to meet project quality expectations.

(6) Project Delivery Team Members are responsible for the quality of the technical product produced.

6. District Quality Control Responsibilities:

a. General: District functional elements are responsible for developing and following quality control processes and business procedures to assure quality products and services.

b. Quality Management Plan: Each functional element shall develop and implement a Quality Management Plan that complies with the policy and procedures presented in this plan and relevant USACE guidelines. The QMP will establish standard quality control practices and business processes to assure quality encompassing all aspects of product and service development/delivery. The QMP shall be reviewed and updated as necessary. Quality management plans for each functional element are attached in the appendices.

c. Quality Control Plan: Each project or project phase shall have a written plan prepared by its Project Manager which establishes the agreed upon requirements of the customer, identifies the Independent Technical Review Team (ITRT), and the procedures that will be employed to ensure compliance with appropriate laws, regulations, policies and technical criteria.

## 7. District Quality Control Procedures:

### a. QC Responsibilities For In-House Work:

(1) Functional Branch Chiefs - The Branch Chiefs, or their designated representative, are responsible for the quality of the products produced by their technical staff and shall approve the selection of discipline specific professionals and reviewers for work developed within their organizations. Team continuity will be maintained through the life of the project to the maximum extent possible recognizing that depending on the complexity of the project, team composition may change as the project progresses and specific project features are better defined. The Branch Chief is responsible for the quality of the final product.

(2) Functional Section Chief - The Section Chief shall:

- Assure that all work prepared by the section staff received all necessary internal checks prior to furnishing the product to the ITRT and other review elements for reviews.
- Review and Accept QCPs prepared by the PMs.

(3) Project Manager and Technical Team Leader (TTL) - The PM and TTL shall be jointly responsible for coordinating the review effort and together with support of the PDT shall:

- Assist in developing the QCP.
- Ensure that the budget and schedule contain sufficient funds, time, and committed appropriate resources to perform reviews of completed products and sub-products.
- Determine the size and composition of the review team (ITRT) with approval by the Branch Chiefs

- Manage responses to review comments/memorandums and resolve technical issues. Forward all unresolved technical issues to the appropriate Functional Chief and PM for final determination.
- Maintain a documentation file of QC actions including reviews, issues, comments, and resolution of issues and comments.

(4) Independent Technical Review Team (ITRT) - The ITRT is responsible for performing an Independent Technical Review of the assigned phase/component of the project. The identification of ITRT members is initiated at the start of a project or project phase at its initial meeting. During this meeting, the various technical disciplines required to be represented on the ITRT will be determined by the PM and the TTL. The PM and TTL will utilize several options in assembling the team. Members may be obtained from in-house resources, other districts of the North Atlantic Division, other USACE Divisions, USACE centers of expertise, A-E consultants, or other sources throughout the USACE. Whenever the review calls for a level of specialized knowledge, experience, or training not possessed by ITRT members, the ITRT members will seek assistance from district functional chiefs in finding appropriate sources of review expertise within or outside the district.

b. QC Responsibilities For Contracted Work:

(1) Architect-Engineers and other Consultants are an extension of the District's PDTs and any products prepared by them shall be subject to the same QCP requirements that would be required for in-house work. All personnel performing these QC activities shall be A-E/Consultant staff.

(2) During an A-E/Consultant effort, the firm will be responsible for the product developed, internal quality control (QC), and technical review for that product prior to submission to the Government.

c. Quality Control Plans (QCP) For In-House Work: Quality Control is an integral part of project development that begins with the selection of a qualified PM, designers and planners; continues with the in-progress evaluation of planning/design criteria, decisions, data and analyses, conclusions, and recommendations; climaxes with a comprehensive review of the final products; and ends with the inspection of completed construction and the distribution of lessons learned. A formal quality control plan will be prepared for all projects upon initiation of a study or design. Generic QCPs may be prepared for products of a routine, recurring nature. For those projects requiring a specific plan, the QCP will include all activities appropriate for the quality management of the project based on the anticipated planning/design and the risk and complexity of the project features. A typical QCP shall include the following elements:

- Purpose
- Applicability of the plan
- General information
- Identification and discussion of all organizational and technical interfaces

- Project Delivery Team to include assignment of all areas of responsibility.
- Independent Technical Review Team identifications
- Review Schedule
- Review Budget
- Identification of the method to be used for the conduct and management of technical review including review comments.
- Technical and legal certification procedures.
- Special Considerations

If any of these required items are already covered within the Project Management Plan (PMP) or Project Study Plan (PSP), they need not be covered again by the QCP. The QCP will be made available to each member of the PDT and ITRT and the customer/sponsor prior to initiation of any QC activities. The ITRT must be notified of any changes to the plan.

d. Quality Control Plans (QCP) For A-E And Other Consultant Prepared Products:

(1) During an A-E or Consultant effort, the firm will be totally responsible for the quality of the product being developed, therefore QC will not be performed by the District. The A-E or Consultant must develop and provide for review and approval a QCP which covers the same elements that would be covered if the plan were developed for in-house work. The A-E or Consultant prepared QCP must be approved by the PDT prior to the initiation of the work.

(2) QCP Submission Requirements: The A-E or Consultant will submit a draft QCP with the original fee proposal that will become a part of the Quality Control documentation. The schedules and milestones presented in the draft plan may need to be finalized after contract negotiations are complete. Any changes which occur in the plan after approval by the Government, must be submitted for review and approval prior the revised plan being implemented. All changes shall be documented in the revised plan by highlighting, footnoting or other approved methods.

e. QCP Level of Detail: The Quality Control Plan is a dynamic document that will change as the project is developed, issues are defined, the project is authorized, features to be constructed are defined, and methods of construction are identified. The level of involvement of the ITRT Team will be tailored to each individual project and project phase. The Civil Works process calls for incremental development of the project features with a different focus and a different level of detail at each project phase. The QC process will be structured to maintain the principle of one level of technical review with the number of ITRT members actually used dependent upon the level of detail in the report, the focus of the product, the consequence of errors, the overall technical complexity of the project features, and the project risk.

f. QC Documentation For In-House Work:



(1) All Project Study Plans (PSPs), and Project Management Plans (PMPs) will include an up-to-date QC Plan.

(2) All review comments will be submitted to the PDT. The technical team leader shall assemble responses to all comments and shall indicate the final disposition of the comment.

(3) A copy of the review memorandum which presents all comments and the final disposition taken on each comment shall be retained in the project technical review file. Resolution must occur for each comment; if agreement can not be reached between the designer and the ITRT member making the comment, the issue will be elevated to the level required to make a final decision.

(4) Appropriate documentation of the QC process, activities, actions, and resolution of issues throughout the project, in accordance with the QCP shall be retained in the project file.

(5) Lessons learned will be documented by the PDT to assure that past mistakes are not repeated and to improve the QC process on future projects. The PDT shall identify and document significant problems and well as successes that are encountered during the life of a project. Basic information shall include the originator of the observation, the project particulars, the applicability, the problem or successful accomplishment, and a recommended course of action.

(6) Other special documentation requirements are covered in the respective functional appendices.

g. QC Documentation For A-E and Consultant Work: The QC documents created during product development shall be in accordance with Paragraph 7.c of this regulation and must be provided to the District along with Lessons Learned for evaluation. ITR comments prepared by the AE's staff must be made available to the Government for inspection. The primary objective is to assure that ITR reviews are conducted in accordance with the approved QCP.

Appendices

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Commanding

TSD Quality Management Plan  
SSD Quality Management Plan  
PPMD Quality Management Plan

Technical Services Division  
Quality Management Plan

## **TECHNICAL SERVICES DIVISION QUALITY MANAGEMENT PLAN**

### **1. Purpose**

This plan provides the general policy and procedures for quality management activities in the Technical Services Division (TSD), and its respective Branches and operating activities.

### **2. Applicability**

This plan applies to all technical activities having responsibilities for: Civil Works, Military, HTRW, SFO, WFO and Real Estate products and projects from planning through construction, operation and maintenance phases. The plan shall be reviewed annually and updated as appropriate.

### **3. References**

3.1. Norfolk District Quality Management Plan.

3.2. See subplans in appendices for references applicable to the quality management practices of the individual functional elements.

### **4. Definitions**

4.1. See Norfolk District Quality Management Plan

### **5. Technical Services Division (TSD) Policy on Quality Management**

5.1. The policy of the Technical Services Division is best exemplified by the statement: "Quality People Producing Quality Products". From the Chief of the Division down to the lowest graded administration and support staff member, the focus on producing a product of value for our customers represents the motivational theme for all the work which is done in the Division.

5.2. As a functional implementation of this policy the management at all levels within TSD strives to identify and obtain the best training available to keep our professional and support staff current in technologies and practices. Training, whether through Corps PROSPECT Courses or courses offered at local universities or seminars represent a visible example of the focus on quality within the staff and their capabilities.

5.3. Coupled with the emphasis on professional development of the staff, the Division management includes in its quality emphasis the necessity for providing suitable resources to the staff to complete their assignments and products in the most efficient manner and through methods which represent the current state of proven technologies and practices.

### **6. Quality Control Responsibilities**

6.1. *Objectives.* TSD Branches shall be responsible for following quality management practices and business procedures to insure quality products. This includes all interim products that are required for the development of an end product, from the inception of planning through

construction-operation. These objectives shall be met by development and execution of Quality Assurance and Control Plans and associated quality control activities.

6.2. *Execution.* Quality control shall be executed in accordance with the guidance set forth herein and within each branch's Quality Management Plan. Subordinate Branch plans are provided herein describing quality control responsibilities for the products that are the primary responsibility of the Planning, Engineering, Real Estate, Construction, Operations, and Regulatory.

6.3. *Quality Management Plan (QMP).* Each branch shall establish, and update annually, a Quality Management Plan (QMP) that complies with the policy and principles presented in this plan and applicable USACE regulations. These QMPs and revisions to such shall be reviewed and approved by Chief, TSD or his designee.

6.4. *Quality Control Plan (QCP).*

6.4.1. *Requirements for Product Specific QCPs:* A quality control plan (QCP) shall be prepared for every product or service, whether obtained using in-house or consultant forces, updated as warranted and reviewed annually. Consultants may include other Corps of Engineers offices, other government agencies and private industry sources. The QCP should include, at a minimum, the requirements set forth in the Norfolk District Quality Management Plan.

6.5. *Quality Control Activities.*

6.5.1. *Responsibilities:* The chief of each functional element shall have overall responsibility for the technical quality of products as assigned in function statements and the appendices to this QMP. Other functional chiefs, the product development team, the project manager, the review team and the review team leader also have significant roles and responsibilities in achieving quality products. These roles and responsibilities shall be described in the branch's QMP.

6.5.2. *Initial Technical Review Strategy Sessions:* The initial technical review strategy session shall form the basis for a quality control plan for all major products. This session shall be held early in the product development phase. The PM shall chair the initial technical review strategy session. Also attending would be the technical project lead and representatives of the customer. In addition to establishing the independent technical requirements, establishing the level of review, cost and schedule of review, identifying documents to be reviewed, the meeting shall identify policy or major technical issues that need to be brought to the attention of the PM for resolution early in the product development. For products of an uncomplicated or routine nature, the initial technical review strategy session may be waived by the PM.

6.5.3. *Independent Technical Review:* Key to the successful execution of the quality control process for the products developed is the independent technical review of a product. This review shall be accomplished by an independent technical review team (ITRT) composed of individuals having expertise in and representing all disciplines involved in the type of product being developed and reviewed, who have a minimum of five years experience in the discipline and who were not involved in product development. Review team members shall be nominated by the function chief(s) of the technical disciplines involved in product development. Branches are strongly encouraged to identify and use reviewers from outside of their branches as these individuals would bring a fresh, unbiased look at the product development process. Outside sources of reviewers include NAD Sister Districts, Regional Technical Specialists, Centers of Expertise, government agencies and private A-Es. Sufficient time and resources shall be allocated to this process

commensurate with the risk and complexity of the technical product. Review comments should be constructive in nature, relevant to the product and should contain the following elements: (a) A clear statement of the concern; (b) The basis of the concern; (c) The significance of the concern; and, (d) The specific actions needed to resolve the concern. The review documentation shall include a statement that a reviewer has no comments during a product review if such is the case. Responses to comments shall also be documented including the backcheck by the reviewer of responses to the reviewer's comments. The nature and extent of ITR should be commensurate with the nature of the project or process in question.

6.5.4. Seamless Review: Subproducts shall be technically overviewed before they are integrated into the overall product. To insure this, product development team members may consult with their Independent Technical Review Team (ITRT) counterparts at appropriate points throughout the development effort to discuss major assumptions and functional decisions, analytical approaches and significant calculations to preclude significant comments from occurring during the final independent technical review which could adversely impact project schedules and costs. These counterpart discussions should normally be initiated by the subproduct developer. The conclusions/agreements reached should be documented, with copies retained by each participant and distributed to the ITRT leader and the product development team leader. The documentation shall become part of the product technical review file.

6.5.5. Dispute Resolution: The PM shall review the products and ITRT comments, product development team responses and backcheck of responses to reviewer's comments to identify any outstanding disagreements between members of the product development team and the ITRT. Any disagreements shall be brought to the attention of the appropriate functional chief to facilitate resolution of technical disagreements between product development and ITRT counterparts. If this interaction does not resolve the issue, the final decision will be made by the responsible functional chief.

6.5.6. Technical and Policy Issue Resolution: Issues involving technical and policy interpretation shall be brought to the attention of the chief of the responsible functional element for resolution.

6.5.7. Products Developed by Contractors: Development and execution of a QCP for products developed by a contractor, including architect-engineer (A-E) firms, A-E firms associated with contractors in design-build contracts, other Corps Field Operating Activities and other agencies shall be the responsibility of the contractor. The QCP for the contractor product shall be reviewed and approved by the PM. In order to maintain contractor responsibility, the contractor shall be responsible for QC of its own work. The in-house technical specialists shall perform independent technical review of the contractor's work.

6.5.8. Final Documentation and QC Certification: Proper documentation is another key component of an effective quality control process. Significant comments, issues and decisions must be recorded and the entire process must leave a clear audit trail. The documentation and certification of the independent technical review and other quality control activities, and where appropriate the Branch's quality assurance processes prescribed in a product's QCP, shall be made part of the project file.

6.5.9. Updating of Quality Control Plans: Quality control plans, product specific, generic and programmatic, whether for in-house or A-E work, shall be reviewed annually and updated as warranted. QCPs shall be updated whenever significant changes require modification of the QCP.

Upon identification of a needed change, the revised QCP shall be submitted to the responsible PM for review and approval within 30 days.

6.5.10. Role of the Project Manager: The project manager is the leader of the product delivery team. One of the project manager's roles is to provide adequate time and resources for the quality management activities associated with a product or service, including but not exclusive to the independent technical review team. However, in order to preserve the independence of the technical review, the project manager shall not be a member of the independent technical review team.

## **7. TSD Quality Assurance Responsibilities**

7.1. *Objectives.* The Technical Services Division shall be responsible for conducting quality assurance activities to assure the following:

7.1.1. Mechanisms and procedures are in-place to enable the in-house technical specialists and their consultants to:

7.1.1.1. Produce quality products that comply with established criteria, methods and procedures, and

7.1.1.2. Apply competent technical resources to decisions and reviews.

7.1.2. In-house technical specialists and their consultants plan, design, and construct safe, functional, cost effective and environmentally sustainable products that accomplish authorized purposes and meet or exceed customer's expectations.

7.1.3. Develop and execute quality control plans that:

7.1.3.1. Provide a level of detail appropriate to the type, complexity and acceptable level of risk of the product;

7.1.3.2. Are consistent with guidance provided; and

7.1.3.3. Provide for documentation of quality control actions, including reviews, comments and resolution of comments.

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Appendices

APP A - Planning Subplan

APP B - Engineering Subplan

APP C - Real Estate Subplan

APP D - Construction Subplan

APP E - Operations Subplan

APP F - Regulatory Subplan

# Appendix A

## Planning SubPlan



**PLANNING BRANCH  
QUALITY MANAGEMENT PLAN**

**1.1 References**

- 1.2 ER 1105-2-100, 22 April 2000, Planning Guidance;
- 1.3 NADR 1110-1-8, 18 September 1998, QUALITY MANAGEMENT PLAN;
- 1.4 CENAO-PL, memorandum, 7 May 1999, subject: Planning's Quality Management Plan;
- 1.5 CENAO-PL memorandum, 11 July 1997, subject: Quality Control and Technical Review Process;
- 1.6 CENAD-ET-P, undated, Quality Assurance for CAP Program & Section 1135 and 204 WRDA 86 & 92 (draft);
- 1.7 CENAD-ET-P, April 1997, North Atlantic Division Quality Assurance Management Plan For Expedited Reconnaissance Studies;
- 1.8 EC 1165-2-203, 15 October 1996, TECHNICAL AND POLICY COMPLIANCE REVIEW;
- 1.9 CENAO-PL memorandum, 22 August 1996, subject: Quality Control, Quality Assurance, and Technical Certification;
- 1.10 CENAD-ET-P memorandum, 28 March 1996, subject: Planning Program Management;
- 1.11 CENAO-PL memorandum, 18 October 1995, subject: Standard Operating Procedures for Technical Review;
- 1.12 CENAO-PL memorandum, 26 September 1995, subject: CENAO-PL Technical Review Process; and CENAO-PL, 25 September 1995, Position Paper on the Technical Review Process for Planning Division.

**2.0 Purpose:**

2.1 The purpose of this Quality Management Plan (QMP) is to update and supplement previous guidance on Quality Control and Technical Review in connection with Civil Works Planning investigations with a view to facilitating the overall process. Quality Control is a formal review process for technical and policy compliance that results in high quality products that are completed on time and within budget. Technical review is the process that confirms the proper selection and application of established criteria, regulations, laws, codes, principles, and professional procedures to ensure a quality product. Technical review also confirms the constructability and effectiveness

of the product and the utilization of clearly justified and valid assumptions and methodologies. In the Civil Works process, Quality Control for technical and policy compliance is key to the district's ability to execute to schedule. Quality control and Technical Review became a District responsibility at the beginning of Fiscal Year 1996. Prior to that time, Divisions had this responsibility. Division offices now have a Quality Assurance (QA) responsibility. QA is a process that provides oversight to quality control and involves an audit of the quality control process. Quality Assurance offers control at each stage of the process such that it becomes very difficult to create a "reject" at the end of the process. In keeping with its QA responsibility, NAD provides an oversight role in concert with the district QC role in which the district is subject to a critical review of its process and procedures. Reference 1a, NADR 110-1-8, dated 18 September 1998, Quality Management Plan, describes its process and procedures for implementation of QC/QA.

### **3.0 Applicability:**

3.1 This Quality Management Plan is applicable to all Planning decision documents in which Planning Division has the primary responsibility or technical lead including:

3.1.1 Reconnaissance Reports;

3.1.2 Feasibility Reports;

3.1.3 General Reevaluation Reports (GRRs);

3.1.4 Limited Reevaluation Reports (LRRs);

3.1.4.1 Documents developed in support of the Continuing Authorities Program (CAP), including Section 3, 14, 103, 107, 111, 205, 208, 1135, 204, and 206 studies;

3.1.4.2 Project Management Plans (PMP's); Feasibility Cost-Sharing Agreements (FCSA);

3.1.4.3 Dredged Material Management Plans

3.1.4.4 Other investigations such as Major Rehabilitation Reports involving either new authorizations or new investment decisions.

3.1.4.5 Planning studies and associated documentation such as those in support of the Flood Plain Management Program (PAS) Programs are not decision documents and as such do not require review and approval by higher Corps authority. Therefore, Quality Control for these types of initiatives will continue to be accomplished through the traditional supervisory review and approval process. Quality Control and Technical Review will be tailored to meet the individual study needs depending on the risk and complexity and at the discretion of the Chief, Engineering Branch; and

3.1.4.6 In addition, in cases where Planning is assigned the lead role, this QMP applies to the preparation and processing of PED Design Agreements, and Project Cooperation Agreements (PCA's).

### **4 Roles and Responsibilities:**

4.1.4 The Chief, Planning Branch has the overall responsibility to assure that Planning investigations are conducted in accordance with this Quality Management Plan and associated

regulations and policy. Specific incorporation/application of the Quality Control and Technical Review process is the responsibility of the Project Manager or Planning Technical Team Leader for a specific investigation. Other key participants in the Technical Review/Quality Control Process include the product/project delivery team (PDT) members and technical review team members who perform technical studies and conduct independent technical reviews, respectively. In addition, the District Engineer, Chief, TSD, Chief, PPMD, other functional chiefs, and Office of Counsel all participate in the overall certification process for Technical Review and Quality Control. Therefore, Technical Review and Quality Control involve a wide range of disciplines and managers to assure that it is effectively incorporated into the Civil Works Planning Process. In conjunction with the district's Project Management Business Process (PMBP), functional Chiefs are responsible to provide the necessary resources and ensure that high quality products are being provided on budget and schedule to the Project Manager and Product Delivery Team. The Chief, Planning Branch has overall responsibility to ensure HQUSACE Civil Works policies and procedures are adhered to.

## **5 General Characteristics of Planning's Quality Control Process:**

5.1 The following general characteristics have been incorporated into Planning's overall Technical Review/Quality Control Process.

5.1.2 *Value Added Approach* -- The overall philosophy of Planning Branch's Quality Control/Technical Review Process is to add value to the studies and reports with an ultimate view of producing high quality products. It is not a lip service process nor one to create extra burdens or unnecessary work. Conversely, it is viewed as a helpful process that benefits everyone, including the working level, the managers, supervisors, senior leaders, and the customers.

5.1.3 *Early Involvement* -- It is essential that Quality Control/Technical Review be incorporated from the very beginning of an investigation. Only then can the strategy and process be established to assure the investigation proceeds in a manner that will result in a high quality product.

5.1.4 *Ongoing and Continuous Review* -- Quality Control/Technical Review must be ongoing and continuous throughout the entire study/investigation. End-loaded review is no longer an effective process because major technical concerns that surface at the end of a study can cause substantial delays in the overall approval process. Continuous technical review throughout the study process will allow resolution of technical issues as they surface which in turn will prevent costly delays in the approval process at the end of the study.

5.1.5 *Independent Review*-- In order for Quality Control/Technical Review to be effective, it must be independent. Those reviewing the documents must not be the individuals working on the day-to-day technical aspects of the study. For example, the economics section of a report should be reviewed by an economist who has not been involved with the conduct of the economic investigations in that particular study.

5.1.6 *Team Oriented Approach*-- The Quality Control/Technical Review Process is team oriented. Although specific technical reviews and issues are identified by individual reviewers, resolution of major issues requires a team approach for guidance and strategy for resolving these issues. This type of approach prevents issues being dealt with in a vacuum. Everyone benefits from a team-oriented approach for resolving major issues leading to production of a high quality document.

5.1.7 *Use of Senior Reviewers*-- Planning Branch's Quality Control/Technical Review Process depends on the use of experienced and senior reviewers to assure quality and efficient reviews. Supervisors and the Chief, Planning Division are included on the independent review teams if they are not involved in the day-to-day study activities.

5.1.8 *Flexible* -- Planning Branch's Quality Control/Technical Review Process is flexible in order to take into account the scope, complexity, and risks associated with the study or planning initiative. For example, Continuing Authorities Studies including Initial Appraisals and Preliminary Restoration Plans are normally smaller in scope, complexity, and cost and Quality Control/Technical Review procedures can be tailored to meet such specific needs. However, any deviations from the normal process must be consistent with NADR 1110-1-8 and approved by the Chief, Planning Division.

## **6 Key Elements:**

6.1 The following summarizes the key elements associated with the Quality Control/Technical Review Process for Civil Works investigations within Planning Branch:

6.1.2 *Quality Control Plan* -- At the beginning of a Planning investigation, the Project Manager/Planning Technical Team Leader will develop a Quality Control Plan (QCP). The QCP is an official written plan which describes a systematic and independent review process to be employed in order to ensure compliance with all technical and policy requirements. The level of detail of the QCP's should be commensurate with the level of risk, scope and complexity of a study. A QCP, should, as a minimum, include the following:

6.1.2.1 A statement of the quality control plan objective

6.1.2.2 A statement of the guidelines that will be followed for the technical review

6.1.2.3 A roster of the proposed project study team

6.1.2.4 A roster of the proposed technical review team

6.1.2.5 A list of documents to be reviewed by the technical team

6.1.2.6 A milestone list and schedule for review activities which integrate the mandated division milestones

6.1.2.7 A discussion of proposed deviations from the district's quality management plan.

In addition, QCP's are to be part of the Project Management Plans when studies advance to the feasibility and subsequent phases. General guidance on development of QCP's is contained in references 1.c. (EC 1165-2-203, paragraph 6.a.(1)) and 1.j. (NADR 1110-1-8, Appendix C). Also, generic or program QCP's (as they are developed) may be used in connection with certain Continuing Authorities studies, expedited reconnaissance studies (Section 905(b) Analysis), and routine/minor investigations to facilitate the process. QCP's are approved by the District Engineer and are available for review and inspection by NAD. In addition, QCP's should be reviewed at least annually to determine if revisions are needed. Revisions should also be coordinated with all PDT and Technical Review Team Members and other study participants as deemed appropriate.

6.1.3 *Technical Review Meetings* -- Technical Review Meetings have become the most important single element of the Norfolk District Planning Branch's Quality Control and Technical Review

Process. Since technical review is an ongoing activity and not something that should be accomplished at the completion of a study, Project Managers/Planning Technical Team Leaders should schedule technical review meetings to discuss and resolve technical planning issues at appropriate times as needed. At a minimum, the Chief, Planning Branch and/or his Senior Planning Reviewer (Planning's Technical Review/Quality Control Point of Contact) should be present. Other disciplines should be included as appropriate in order to adequately resolve the specific technical issues. It is the responsibility of the Project Manager/Planning Technical Team Leader to schedule the Technical Review Meetings in coordination with Planning's Quality Control/Technical Review POC/Senior Technical Reviewer. The Senior Technical Reviewer will document the meeting and include follow-up actions required in order to resolve the specific issues. Even if no issues surface, periodic meetings should be scheduled to discuss status and overall progress and direction of the investigation. Technical Review Meetings are also used to review policy compliance and execution performance (i.e. milestones and expenditure/obligation performance). It should also be noted that the Project Manager/Planning Technical Team Leader should discuss the Technical Review Process and strategy for development of a QCP, including establishment of an independent review team, at the initial study team kickoff meeting (Technical Review Strategy Session per NADR 1110-1-8).

*6.1.4 Technical and Policy Review of Products from Support Elements* -- As indicated in previous SOP, dated 18 October 1995 (reference 1.f. above), the Project Manager/Planning Technical Team Leader will coordinate with each office responsible for reviewing a specific technical work product to request a technical and policy review be performed and to identify who will be responsible for the review. Independent review should include technical work and products from Economics, Engineering, Environmental, Cost Estimating, Real Estate, Counsel, and other disciplines as appropriate. Technical review can be performed by other Corps Offices and qualified A-E firms as needed. In addition, study work tasks performed by A-E firms will normally be technically reviewed by Corps personnel either within NAO or by other Corps offices. Exceptions to this policy should be approved by Chief, Planning Branch. Within Planning Branch, Section Chiefs/Team Leaders will assign independent technical reviewers as needed for specific planning disciplines such as economics and the environment. It is important for technical review to be performed as an independent and ongoing activity as the work progresses in order to eliminate lengthy review following completion of the work product. Therefore, Project Managers/Planning Technical Team Leaders should notify the various District elements early in the study process of the need for concurrent technical review and written certification of this review as inputs are provided in the study. All review comments shall be documented in a comment, response format, including action required and action taken. The development and use of checklists for technical and policy compliance review are strongly encouraged. Appendix C of NADR 1110-1-8 and Appendix B of EC 1165-2-203, provide a Technical Review Checklist and a list of Policy Compliance Review Considerations, respectively, which should be used during the duration of a planning study as tools to facilitate both technical and policy review.

*6.1.5 Technical and Legal Review Certification* -- Documentation of the independent technical and policy review shall be accompanied by a certification, indicating that the independent technical review process has been completed and that all technical issues have been resolved. The review process will provide a forum to document how technical and policy issues are to be addressed and resolved. This requirement applies to all decision documents that will be forwarded to CENAD for approval and all documentation that will be forwarded to HQUSACE for either review or approval. For the feasibility study process, it applies to all final reconnaissance reports, pre-conference documentation for issue resolution conferences and Alternative Formulation Briefings and draft and final feasibility report submittals. For submittals that are transmitted to the division under the district commander's signature, the certification will follow the requirements of EC 1165-2-203. For

submittals that are normally transmitted under the signature of the Chief of Planning or Chief, Technical Services Division, the certification may be included in a transmittal letter for the product and review documentation, which would be signed by the Chief of Planning or Chief, Technical Services Division. For the Continuing Authorities Program, certification is required for all Detailed Project Reports (feasibility reports) and Ecosystem Restoration Reports. Sample certification and findings reports are included in EC 1165-2-203, Appendix A, Statement of Technical and Legal Review Sample and NADR-1110-1-8, Appendix H, Model of District Engineer's Quality Control Certification. It should be noted that this document is signed by all Technical Review Team members and the Chief, PPMD, Chief, Technical Services Division, and appropriate Branch Chiefs in Planning, Engineering, Construction, Operations, and Real Estate. Since NAD has included the District Engineer's signature on its suggested model certification, it will be the policy of the Planning Division to include his signature on the formal certification of Quality Control and Technical Review required for Planning Decision documents which are submitted under his signature to NAD and HQUSACE. It is also important to note that District Counsel or his authorized representative is required to sign a Certification of Legal Review. Attachment 1 is a sample Certification of Independent Technical and Legal Review for ready reference.

6.1.6 *Technical Review File*-- Knowledge of Civil Works policies and procedures, and in particular, documentation, continues to be important and essential elements of the Quality Control and Technical Review Process. Each Project Manager/Planning Technical Team Leader will maintain a Technical Review file containing all records pertaining to technical review and quality control for each individual planning investigation. The file should be kept up to date and located in Planning Division's central office files. The Project Manager/Planning Technical Team Leader should bring the files to each technical review meeting. In addition, periodic inspections of the files will be made by the Chief, Planning Division or Planning's Quality Control/Technical Review POC to assure that the files are being kept up to date. Examples of items that should be contained in the files include: (1) Quality Control Plans, including NAD approval letter; (2) records of initial scoping meetings kicking off studies which include a discussion of the Quality Control and Technical Review Process (Technical Review Strategy Sessions); (3) Technical Review Meeting Minutes, including any documentation of required follow-up actions; (4) all review comments made on study products (typed, handwritten, annotated, etc.) and associated resolution of the comments; (5) all E-mail, or other notes, etc. documenting issues and follow-up actions and/or discussions; (6) certification of technical review of individual products from within Planning or other district elements supporting the study; (7) copies of the overall formal technical and legal certification of the entire decision document including Quality Control Report which summarizes major issues and how they were resolved; (8) all correspondence (including E-mail and record of phone conversations) with higher authority documenting issues, milestone meetings, certification and approval of documents, etc. and (9) any other form of documentation that can be related to Quality Control and Technical Review.

6.1.7 *Quality Control Report (QCR)* – In accordance with ER 1105-2-100, dated 22 April 2000, Planning Guidance, documentation and certification of technical/legal review will accompany feasibility reports and other decision documents submitted for HQUSACE policy compliance review. In this regard, a Quality Control Report (QCR) will be prepared and submitted with all draft and final feasibility and similar decision documents to fully document the district's efforts for continuous and independent Quality Control and Technical Review. Documentation will include but not be limited to copies of Technical Review Meeting Minutes, technical review comments and responses, and formal certification of independent technical and legal review. Documentation for other major planning milestones, such as the Section 905(b) Analysis during the reconnaissance phase and the Formulation Analysis Notebook for the Alternative Formulation Briefing (AFB) during the feasibility phase, will consist of a summary of major technical issues and proposed solutions.

## **7 Performance Indicators:**

7.1 In order to effective, a Quality Management Plan, must incorporate performance indicators to provide the Chief, Planning Branch a mechanism to monitor and ensure Quality Control and Execution of the Civil Works Planning Program. There is also a need to develop an early warning system should problems surface during the study. In this regard, the following are elements/performance indicators that will assist the Chief, Planning Branch in ensuring studies are being accomplished in a manner that mains the highest level of Quality Control throughout the duration of the investigation.

7.1.2 *Obligation and Expenditure Schedules* -- A monthly summary report (D-16) is prepared for all studies/projects showing scheduled and actual obligation and expenditures. This is an important element for monitoring and identifying potential execution problems by Chief, Planning Division. In addition, Programs prepares a monthly report to send to NAD summarizing execution progress. Chief, Planning is provided a copy.

7.1.3 *Milestones* -- A Planning Milestone list is prepared at beginning of Fiscal Year and maintained for ready reference and monitoring on a monthly basis by Chief, Planning.

7.1.4 *Technical Review Meetings* -- Periodic technical review meetings are scheduled by Project Managers/Planning Technical Leaders and documented by Planning's Senior Technical Reviewer. Minutes of meetings include required follow up actions for monitoring by Chief, Planning.

7.1.5 *Product Review*-- Reports and other related products are technically reviewed during study and not end-loaded reviewed by appropriate technical review team prior to certification by Division Chiefs and/or District Engineer. This review should by ongoing.

## **8 Summary**

8.1 Quality Control/Technical Review as a relatively new district responsibility continues to be an evolving process. As HQUSACE considers further delegated authority, Quality Control and Quality Management will be key to ensuring accountability for technical and policy compliance. Planning Branch will continue to review and monitor our process with a view to improving it as we learn from our experiences. Any questions or need further information concerning this Quality Management Plan should be directed to Tom Yancey, Planning's Quality Control POC, at (757) 441- 7775.

## ATTACHMENT A-1

### SAMPLE

#### CERTIFICATION OF INDEPENDENT TECHNICAL AND LEGAL REVIEW

The district has completed the Draft Report for the AIWW Bridge Replacement Deep Creek, Chesapeake, Virginia, Section 216 Feasibility Study. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, material used in analysis; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. The independent technical review was accomplished by an independent district team. Documentation of Technical Review during the feasibility study is contained in the preceding sections of the Quality Control Report.

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Lawrence H. Ives, TS-PR  
Project Manager

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Ronald G. Vann, TS-P  
Technical Review Leader

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Tom Yancey, TS-P  
Technical Reviewer

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Mark Mansfield, TS-PR  
Team Member

---

Ian Mathis, IWR  
Technical Reviewer

---

Helene Haluska, TS-PE  
Team Member

---

Craig Seltzer, TS-PE



Technical Reviewer

---

Brenda Gartman, TS-RA  
Team Member

---

Wayne Barnes, TS-R  
Technical Reviewer

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Robert Turner, TS-R  
Technical Reviewer

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Bruce Sharp, TS-R  
Team Member

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Robert Turner, TS-R  
Technical Reviewer

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Randy Born, TS-EG  
Team Member

---

Matt Byrne, TS-EG  
Technical Reviewer

---

Marc Gutterman, TS-EG  
Team Member

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Matt Byrne, TS-EG  
Technical Reviewer

---

Eric Legaspi, TS-ON  
Team Member

---

T.D. Woodward, TS-ON  
Technical Reviewer

---

Pat Jones, TS-ES  
Team Member

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Carlton Lillard, TS-ES  
Team Member

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Brad Atkins, TS-ES  
Technical Reviewer

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Gary Szymanski, TS-EC  
Team Member

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B.O. Taran, TS-EC  
Technical Reviewer

---

Mike Hall, TS-EE  
Team Member

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Alan Ellinwood, TS-EE  
Technical Reviewer

---

Joe Loschi, SS-C  
Team Member

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Bob Oswald, SS-C  
Technical Reviewer

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Joel Scussel, TS-OO  
Team Member

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Tom Friberg, TS-OO  
Technical Reviewer

\_\_\_\_\_  
Steve Martin, TS-G  
Team Member

\_\_\_\_\_  
Nick Konchuba, TS-G  
Technical Reviewer

#### CERTIFICATION OF LEGAL REVIEW

The Draft Report for the for THE AIWW BRIDGE REPLACEMENT DEEP CREEK, CHESAPEAKE, VIRGINIA, SECTION 216 FEASIBILITY STUDY has been fully reviewed by the Office of Counsel, USAED, Norfolk, and is legally sufficient.

\_\_\_\_\_  
Joseph R. Loschi  
District Counsel

Date:\_\_\_\_\_

## QUALITY CONTROL CERTIFICATION

As noted above, the district has completed the Draft Section 216 Feasibility Report for the AIWW Bridge Replacement, Deep Creek, Chesapeake, Virginia. In addition, documentation of Independent Technical Review is contained in the Quality Control Report and Certification of Completion of Independent Technical Review, as well as Certification of Legal Review is included above. All issues and concerns resulting from technical review have been resolved.

\_\_\_\_\_  
James N. Thomasson, P.E.    Date  
Chief, PPMD

\_\_\_\_\_  
William A. Sorrentino, P.E.    Date  
Chief, TSD

\_\_\_\_\_  
Allan B. Carroll Date  
District Commander

Appendix B

Engineering SubPlan

## **ENGINEERING BRANCH QUALITY MANAGEMENT PLAN**

### **Purpose.**

This appendix provides the general policies and procedures for the execution of quality management activities conducted for engineering products.

### **1. Applicability.**

1.1 This appendix applies to all activities of the Engineering Branch involved in the preparation, review, and approval of engineering products.

### **2. References**

2.1 See TSD Quality Management Plan

2.2 Engineering Branch Design Guide

2.3 Enclosure #1 – Quality Management Guidelines for HTRW work.

2.4 Enclosure #2 – Sample Quality Control Plan

### **3. Definitions.**

See paragraph 4 of the Norfolk District Quality Management Plan.

### **4. General.**

4.1 The policy of the Engineering Branch is to deliver quality engineering products, on time and within budget to our customers. The policies, requirements, and directions contained in the Engineering Branch Design Guide are considered mandatory parts of the Quality Management Plan and the Quality Control Plan for all projects.

4.2 *Quality Management Plans* The engineering quality management plan is a part of the overall District Quality Management Plan and shall provide the general guidance for work produced by the Engineering Branch, including the input provided by other functional organizations which support the development of the engineering products. Engineering Branch management shall evaluate and approve the engineering portions of the district Quality Management Plans.

4.3 *Quality Control Plans* All engineering and design services shall be prepared using a product specific, generic or programmatic quality control plan. Quality Control Plans shall present a focus area within the Project Management Plan (PMP) for a project. The responsible PM shall review and approve the quality control plan for their respective projects.

4.4 *Quality Assurance* Engineering Branch is responsible for quality assurance of quality control activities for engineering products prepared by the in-house professional staff as well as products designed wholly by a consultant or a combination of consultant and in house forces. For

that portion of work conducted by consultants, the Engineering Branch shall be responsible for quality assurance of the consultant's quality control activities and shall maintain a general oversight of this process.

4.5 *Programmatic/Generic Quality Control Plans* Product specific quality control plans shall be prepared for all products except those of a routine, recurring nature. Cost, complexity, risk and visibility shall be the criteria used to determine if a product specific or programmatic/generic QCP is required.

4.6 *Funding* Quality control activities shall be funded by the appropriate project.

## **5. Quality Control Responsibilities**

5.1 Engineering shall prepare Quality Control Plans for each engineering product.

5.2 The Quality Control Plan shall be a document supplementing the general quality control activities outlined in TSD's Quality Management Plan and describing unique quality control activities for a specific product. As such the length and level of detail should be commensurate with the risk and complexity of the product. The Quality Control Plan shall address (at a minimum) the following:

- Name of Project
- Description of Product
- Name and location of customer
- A statement of the quality control plan objective.
- A statement of the quality guidelines that will be followed for the technical review.
- Members of the product development team.
- Members of the Independent Technical Review Team with a statement of the technical qualifications of each member in their respective areas of expertise. (Including Mandatory Centers of Expertise and Centers of Standardization.)
- Major Milestones
- Unique, sensitive or high visibility items requiring special attention. Include items, which require technical or policy clarification, and environmental constraints such as complying with records of decision.
- A list of documents to be reviewed by the independent technical review team, and dates of scheduled reviews.
- Special interest items such as value engineering, cost controls, contractor evaluation procedures, acquisition strategy, etc.

The quality control plans for all engineering documents that are supported by NEPA or other environmental documentation shall include an independent technical review to ensure consistency between the environmental documentation and the engineering documents.

5.3 *Approval of Quality Control Plans* The Chief of Engineering Branch shall certify (i.e. review and approve) that the plan meets the customer's needs and conforms to Corps of Engineers requirements by reviewing and approving the QCP.

5.4 *Use of Checklists* Checklists shall be used to guide the independent technical review and insure that critical items are not overlooked. Checklists may also be used to simplify the

documentation of the independent technical review. The use of checklists in the documentation would not, however, eliminate the requirement to document specific comments.

**5.5 Quality Control of Consultant's Work** The consultant shall prepare a quality control plan which discusses the quality control and its relationship to the entire project. For design-build contracts, the Contractor shall develop and follow a QCP for their product including independent quality control of the design product and construction quality control activities. The level of detail for this plan will be commensurate with the size and complexity of the project. Government review of submittals shall be to assure compliance with the request for proposal (RFP), the accepted proposal, and for QA of the contractor's quality control activities. The contractor's quality control plan shall be approved by the Resident Engineer of the applicable Area or Resident Office.

**5.6 QC Certification and Final Documentation** Proper documentation is a key component of an effective independent technical review process, and is a significant resource for lessons learned in the quality control process. Significant decisions must be recorded and the entire process must leave a clear audit trail. The Chief of Engineering shall certify to the Chief Technical Services Division that the quality control process for that product has been completed and that all identified technical issues have been resolved. This certification and accompanying documentation shall be made a part of the official District project files.

**5.7 General Requirements.** The following requirements apply to all engineering products except as noted:

*Independent Technical Review Process:* In addition to supervisory review, quality control procedures shall include independent technical and seamless review.

*Formation of Independent Technical Review Team (ITRT):* The ITRT shall be assigned representatives from disciplines involved in product development, such as plan formulation, economics, environmental, hydrology and hydraulics and coastal engineering, water quality, HTRW, civil design, structural design, geotechnical, real estate, project management and other disciplines, as required. Since careful coordination between these disciplines is required, the ITRT must include senior staff with broad expertise. The members of the ITRT must be independent from those who perform the work. Supervisors and work leaders of product development team members shall not normally be included on the ITRT. If sufficient staff is not available in a district, or if specialized review expertise is required, the PM shall supplement the review team with personnel from other NAD Districts, other USACE Divisions, headquarters, centers of expertise, laboratories, the customer's organization or by contract. Project funds shall be used to pay for the cost of conducting technical reviews.

*For Water Control Products.* Districts shall consult with MSC Water Control Center staff when selecting a water control ITR Team member.

*Review Systems:* The use of a review management system, Dr. Checks, shall be encouraged for use in all projects and is required for all MILCON products. Reviews must be completed prior to major decision points in the process so that the technical results can be relied upon in setting the course for further activities.

*Product Review.* The QCP shall identify products to be reviewed by the ITRT, a schedule as well as cost for these reviews. These products shall be essentially complete before review is undertaken and the section chiefs shall be responsible for accuracy of the computations through design checks and other internal procedures, prior to conducting of an independent technical



review. The products shall be reviewed using an interdisciplinary team approach. The products shall be reviewed for scope, adequate level of detail, compliance with guidelines and policy and customer needs, consistency, accuracy, and comprehensiveness as outlined in the QCP.

*Interdisciplinary Review.* All members of the ITRT shall be expected to raise concerns in other functional areas. These concerns shall be addressed to the ITRT as a whole. The ITRT shall then work through the appropriate ITRT counterparts to resolve the issues/concerns. ITRT meetings shall be open.

*Responses to ITRT Comments:* The ITRT shall meet with the study/product development team to resolve the raised issues. Along with a description of the scope of the review, all review comments shall be documented in a comment, response, action required, action taken and backcheck format. In those cases where unresolved disputes between the design team and the ITRT are decided by a functional chief, the review documentation shall provide the basis for the functional chief's decision.

## 5.8 Civil Works Products

*Civil Works Milestones.* As part of the Quality Control process, Districts shall follow a milestone system for development of civil works engineering products in the design (post feasibility) phase. Although a formal milestone system is a difficult mandate, guidance is provided below for minimum requirements. Specific milestone objectives shall be tailored to the engineering product and included in the product's Quality Control Plan.

Milestones for Civil Works projects are significant or important events in the execution of the project. Milestones are important tools for measuring progress along a pre-defined path to the completion of the project. The milestones that are defined below are not a complete list of all activities that must be performed to complete a project. These milestones are considered to be the major accomplishments that must be completed on schedule to help ensure that the overall final product is technically correct and satisfactory to the local sponsor. The numbers shown in parentheses indicate milestones tracked by Programs and Project Management Division and included in the Project Executive Summary Report. Milestones tracked by headquarters as Command Management and Review (CMR) dates are identified by "(CMR)".

### Design Documentation Report Milestones:

- D1 Design Documentation Report Initiated (400)
- D2 General Design Conference (270)
- D3 Technical Review Strategy Session
- D4 Quality Control Plan Approval
- D5 Value Engineering Study Completed
- D6 Submit Intermediate Design Documentation Report for Independent Technical Review
- D7 Submit Near-Final Design Documentation Report for Independent Technical Review
- D8 Local Sponsor Review Completed
- D9 Quality Control Certification
- D10 Design Documentation Report Approval (480)

### Plans and Specifications Milestones:

- P1 Plans and Specifications (P&S) Initiated (500)
- P2 Design Coordination Meeting
- P3 Technical Review Strategy Session
- P4 Quality Control Plan Approval
- P5 Submit Intermediate P&S for Independent Technical Review
- P6 Submit Near-Final P&S for Independent Technical Review
- P7 Biddability, Constructability, Operability and Environmental (BCOE) Review Conference
- P8 Final Local Sponsor Review Meeting
- P9 BCOE Certification
- P10 Quality Control Certification
- P11 Plans and Specifications Approval (290)(590) (CMR)

#### Engineering During Construction Milestones:

- C1 Pre-Advertise Contract in Commerce Business Daily
- C2 Construction Contract Advertised (950)
- C3 Government Estimate
- C4 Bid Opening (951)
- C5 Engineering Considerations and Instructions to Field Personnel Report
- C6 Construction Contract Awarded (960) (CMR)
- C7 Final O&M Manual Transferred to Local Sponsor (981)
- C8 As-Built Drawings Transferred to Local Sponsor (982)

#### *Hydraulic, Hydrologic and Related Products.*

Activities associated with the development of hydraulic, hydrologic, water quality, water control, sediment, groundwater and related products shall be outlined in the format of a Hydrologic Engineering Management Plan (HEMP), as required by EP 1110-2-9. The HEMP is a quality control measure for ensuring the complete outline of required H&H related activities and their interrelationship with other product development activities that are required in the development of engineering products, and their costs, and is consistent with guidelines set forth in ER 1110-2-1150. The HEMP format shall be utilized in the H&H related scoping contained in a study's/project's PSP or PMP, respectively.

Certification of the Without-Project Hydrology - Civil Works GI Studies. Because of the critical need to establish the without-project hydrology early in a flood control planning study, the Chief of the Civil Works Support Section will certify the hydrology prior to the first milestone conference in the feasibility phase. This certification will be included in the review documentation.

#### *Engineering Appendices for Decision Documents.*

Submittal of Engineering Appendices. An engineering appendix is an essential part of a feasibility report or post-authorization decision document for a Civil Works project. And, for any decision document that is not approved at the district, the policy compliance review of the engineering appendix will be completed by CENAD. Either a printed copy or an electronic copy of the engineering appendix will be transmitted to CENAD with the draft decision document for policy compliance review. A printed copy of the engineering appendix will be included with the submission of the final report since the appendix will be published with the final decision document that supports authorization or the signing of a PCA.

*Section 1202 of WRDA 1986* Section 1202 of WRDA 1986 (PL 99-622) requires that any report submitted to Congress for the purpose of authorizing or funding the "construction of a water impoundment facility, shall include information on the consequences of failure and geologic or design factors which could contribute to the possible failure of such facility." This requirement can be met by including the analysis in the Engineering Appendix and a summary of the consequences in the recommendation section of the main body of the report. The independent technical review of the decision document should identify and confirm that the requirements of Section 1202 have been met

5.9 Military Construction, HTRW, WFO and SFO programs. The following special requirements apply to these programs.

Design review shall be in accordance with ER 1110-345-100 paragraph 9 and ER 1110-1-12 paragraph 6h(3) except that design by private A-E firms shall be reviewed by the A-E with a quality assurance review by the district. Requirements include but are not limited to the following:

A QCP should be prepared for every engineering product or service whether obtained using in-house forces, an A-E or an A-E product in a design-build contract. While the QCP should be complete, it need not duplicate items in the QMP.

For contract work, the A-E shall be required to submit a QCP. The nature of the QCP shall be determined with the A-E in pre-proposal meetings. The QCP should be provided to the project manager for incorporation into the project management plan (PMP) prior to initiation of the technical work on the project. For large or complex projects the A-E may be allowed to initially submit a generic QCP, with a fully detailed QCP furnished in the first phase of the work. The extent of the independent review should be commensurate with the complexity of the project and is not intended to be a detailed check. All design reviews will be accomplished using the Dr Checks review management system. Designs prepared by private A-E firms will be given an independent technical review by the A-E, with a quality assurance review by the district office.

A QCP shall be submitted for A-E products in a design build contract. Designs prepared by A-E firms in design build contracts shall be reviewed by the A-E with a quality assurance review by Engineering Branch. In design build contracts, the Engineering Branch shall review design submittals to assure compliance with the RFP and the accepted proposal.

Review of in-house designs and quality assurance reviews of A-E products should be performed by a interdisciplinary team specifically selected based on project requirements. The use of Technical Centers of Expertise and Centers of Standardization for projects is strongly encouraged. Certain projects or portions of projects require special design procedures or review by the Mandatory Centers of Expertise (MCX). These MCX include the Utility Monitoring and Control System MCX; HTRW MCX; Intrusion Detection Systems MCX; Protective Design MCX; Army Range and Training Land Program MCX; and Transportation Systems MCX.

Engineering products for the Military, WFO, and SFO programs shall be reviewed in accordance with a QCP. The QCP shall be developed using the District QMP and Division QMP as guides. However due to the wide variety of products and the unique requirements imposed by various customers, the individual QCP may be adjusted to meet any special requirements.

Quality management guidelines for HTRW programs are provided in Enclosure #1.

5.10 Flood Recovery Efforts: Due to its special requirements, Natural Disaster Procedures are classified as a unique function of the Corps as prescribed in the North Atlantic Division organizational guidelines. Quality control of products resulting from flood recovery efforts is prescribed in the existing engineering regulations outlined in the above referenced subplan as well as below:

Code 200 Emergency Operations (Flood Response and Post Flood Response): Due to the emergency nature of the products developed under this authority, quality control of flood response products shall consist of peer or supervisory review, only, prior to implementation. Quality control of post-flood response products shall be accomplished by NAD until an approved QCP is developed and approved by the district.

Code 300 Rehabilitation Assistance: Quality control plans and independent technical review are required for products developed under this authority.

5.11 QA/QC of Laboratory Investigations and Testing: The responsibilities, policies, procedures for laboratory investigations, materials and chemistry testing and analytical services performed in support of design, construction and operation of Civil Works, Military and Support for Others programs.

## ENCLOSURE 1

# DESIGN QUALITY MANAGEMENT PLAN (QMP) HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) PROGRAM

**1. PURPOSE:** The purpose of this document is to establish quality management procedures for assuring that HTRW work performed by Norfolk District achieves a consistent level of quality in conformance with regulatory requirements, and professional standards.

**2. APPLICABILITY:** This document is applicable to all HTRW work performed in support of Norfolk District including work performed by in-house staff, contract A-E firms, and sister districts, such as, NAD HTRW Design Centers (Baltimore and New England).

**3. REFERENCES:** The following source documents are incorporated by reference herein. These documents provide detailed documentation and requirements applicable to quality management for Norfolk District work products over and above those specified directly in this document.

- a) North Atlantic Division Quality Management Plan, Appendix D- Design Quality Management for Hazardous, Toxic, and Radioactive Waste (HTRW) Work in the North Atlantic Division, dated August 2000.
- b) ER 5-1-11, U.S. Army Corps of Engineers Business Process, dated 14 February 2001
- c) ER 415-1-11, Biddability, Constructibility, Operability, and Environmental Review, dated 01 September 1994
- d) ER 1110-1-12, Engineering and Design Quality Management, dated 1 June 1993
- e) ER 1110-1-263, Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities, dated 30 April 1998
- f) EM 200-1-2, Technical Project Planning (TPP) Process, dated 31 August 1998
- g) EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans, dated 01 February 2001
- h) EM 200-1-6, Chemical Quality Assurance for HTRW Projects, dated 10 October 1997
- i) Norfolk District Engineering Branch Design Guide, dated 11 November 2000
- j) Norfolk District Technical Services Division Quality Management Plan, dated April 2001

**4. RESPONSIBILITIES:**

- a. Project Manager: The Project Manager (PM) is responsible for leading the Product Delivery Team (PDT) and for ensuring that all work is performed in a quality manner consistent with customer expectations and in conformance with applicable regulatory requirements, and good business procedures. The PM leads the development of the Project Management Plan (PMP) and helps focus the PDT's efforts to accomplish the work in accordance with the agreed upon scope of work, schedule, and budget. The PM employs the expertise of the PDT members to determine the procedures necessary to achieve the targeted level of quality. The PM works closely with the customer to ensure that the customer's expectations are clearly understood and articulated to the PDT, and that the customer is aware of the applicable rules, regulations, codes, and professional standards governing execution of the HTRW work.
- b. Project Engineer: The Project Engineer (PE) provides technical leadership of the PDT during the development of engineering deliverables. The PE coordinates technical work execution in conformance with the Norfolk District Engineering Branch Design Guide, the project-specific PMP, the Norfolk District Design Quality Management Plan (QMP), and project specific QMPs and Quality Control Plans (QCPs).
- c. Chief, GeoEnvironmental Engineering Section (GeoE): The Chief, GeoE, is responsible for the delivery of accurate, timely, and cost-effective deliverables in support of PMs in Norfolk District, consistent with the project-specific PMP/QMP/QCP. The Chief, GeoE, is responsible for assuring that the PDT is staffed with personnel possessing the necessary technical capabilities to properly execute the work. The PDT can be staffed with in-house personnel, A-E Contractors, sister district personnel such as personnel from NAD HTRW Design Centers (NAB and NAE), or a combination thereof. In addition, the Chief, GeoE is responsible for assuring that appropriate quality control/quality assurance is provided for *all* HTRW work consistent with the Norfolk District Technical Services Division Design Quality Management Plan (QMP), and project specific QMPs/QCPs.
- d. Product Delivery Team (PDT) Members: PDT members are directly responsible for development and delivery of project-specific deliverables. PDTs consist of Norfolk District in-house personnel, A-E Contractors, sister district personnel such as personnel from NAD HTRW Design Centers (NAB and NAE), or a combination thereof. PDT members work with the PM in developing project scope and budget. Individual team members are responsible for the quality of their own work, and for keeping commitments for completion of their portion of the project as documented in the PMP. The Project Engineer (PE) provides technical leadership for in-house PDT members and serves as the technical Point of Contact (POC) for external PDT members. Initial QC review of PDT work efforts is accomplished internal to the PDT members' Section as outlined in the Norfolk District Engineering Branch Design Guide.
- e. HTRW and Ordnance and Explosives (OE) Centers of Expertise (CX) and NAD HTRW Design Centers: The HTRW Center of Expertise (Omaha, Nebraska), the OE Center of Expertise (Huntsville, Alabama) and the NAD HTRW Design Centers (Baltimore District and New England District) provide technical support and quality oversight.

**5. QUALITY MANAGEMENT FRAMEWORK:** Quality is a primary goal for all Norfolk District deliverables whether produced by in-house personnel, A-E Contractors, sister district

personnel, or a combination thereof. All work will be performed in accordance with the Norfolk District Technical Services Division Quality Management Plan, as well as the project-specific PMP, QMP, and QCP. Quality Control of work products produced by A-E Contractors and/or sister districts will be documented in the applicable project-specific Work Plan and QCP. In order to maintain A-E Contractor accountability, the A-E Contractor shall be responsible for his/her own quality control on their deliverables. Norfolk District will provide quality assurance oversight of A-E Contractor-produced deliverables through in-house resources, other A-E Contractors, sister district resources, or a combination thereof. Qualified Norfolk District personnel with the requisite knowledge and experience will be utilized to fulfill the Project Engineer (PE) role. The PE will help ensure that the PDT achieves the objectives of the QMP. The following sections provide more detailed discussion of required quality control provisions for project specific deliverables.

- a. Project Staffing: In accordance with the PMP, Chief, GeoE, will assign a Project Engineer (PE) to prepare the product/deliverable. The PE will work with the Chief, GeoE, and the PM to identify appropriate technical team members for the PDT. Chief, GeoE, will also identify appropriate Independent Technical Review (ITR) team members. Appropriate members of the PDT will work with the PM in performing the project-specific acquisition strategy review. The acquisition strategy review will be used to determine if in-house, sister district, or contract support (or some combination thereof) will be applied to execute the customer's desired work effort.
- b. Scope of Work (SOW) Development: The nature of this work necessitates detailed scopes of work (SOW). The PM and PDT will work with the customer early in the project scoping process to identify site-specific requirements and to refine those requirements in light of safety, regulatory, fiscal, schedule, and other constraints. The services of the NAD HTRW Design Centers and USACE guidance on HTRW Scope of Work preparation will be utilized, as applicable. PDT members are integrally involved in developing the technical aspects and approach to be specified in the SOW. The PM and PDT will hold periodic meetings to help focus the PDT on producing high quality deliverables on time, within budget, and in accordance with the PMP and customer expectations.
- c. Acquisition Planning: At the start of each individual aspect of the project, the PM and appropriate PDT members will perform project-specific acquisition planning. The objective of the project-specific acquisition planning is to determine the most appropriate approach and contract vehicle for executing the defined project scope. Acquisition planning participants include the PM and PE as well as representatives from Construction and Contracting Divisions. Acquisition Plans consider existing in-house contracts, other USACE District in-house contracts, and small business and minority set-asides.
- d. Project Budgets.

1.) In-House Project Budgets: Project budgets which provide the basis for work assignments are developed through direct input from appropriate technical personnel based upon the agreed upon Scope of Work (SOW). When the SOW is developed, the PE provides the SOW to Section Chiefs of the appropriate technical sections with a request to provide a detailed project budget. Standardized cost estimating spreadsheets are utilized to facilitate uniformity of cost estimates and to help ensure all applicable costs are captured. In the event that the estimated project budget exceeds the PM's expectations and/or budget, the PM and the PDT will work together to better define project-specific

expectations. The SOW and/or project budget may be modified to reflect the better understanding of the project-specific expectations. The PDT and PM must agree on a project budget, schedule, and SOW before proceeding with any execution of project activities.

2.) A-E Contractor Project Budgets: When the decision is made to access an A-E Contractor for project support, the PE provides the SOW to the Engineering Branch A-E Coordinator. The Engineering Branch A-E Coordinator provides the SOW to the selected A-E Contractor through a letter signed by the Contracting Officer's Representative (COR). The PE (with support from the PDT) prepares an Independent Government Estimate (IGE), based on the pre-established rates outlined in the A-E Contractor's specific contract, prior to requesting a proposal from the A-E Contractor. To facilitate negotiations, bid schedules are established for each SOW and provided to the A-E Contractor's for inclusion in their proposal submissions. The A-E Coordinator, with support from the PE, will ensure each A-E Contractor understands the SOW, the expectations for each deliverable or phase of work, and the requirements for the QCP. The A-E Coordinator, with support from the PE, assesses each A-E Contractor's proposal for the appropriate level of effort and applicable contract rates. Negotiations and documentation procedures for A-E Contractor proposals and subsequent delivery orders and modifications are in accordance with Norfolk District Contracting Branch requirements.

- e. Technical Project Planning (TPP): TPP is a comprehensive and systematic process focused on effective planning to identify project objectives and design data collection programs. TPP seeks to involve all project stakeholders (including regulatory authorities) to achieve consensus on project objectives and approach prior to starting project activities. Requirements for TPP are specified in EM 200-1-2, *Technical Project Planning (TPP) Process*. The use of TPP is preferred for all projects as it can save considerable money over the long-run. The *general* TPP approach is utilized to help minimize conflicts, facilitate communication/decision making, provide buy-in from regulators and stakeholders, and to help ensure that project objectives are clearly defined and that the data collection program meets data quality objectives/project objectives in a timely and cost effective manner.
- f. Chemical Data Quality Management: Chemical data quality management is governed by ER 1110-1-263, *Chemical Data Quality Management for Hazardous Waste Remedial Activities*. This document addresses the full range of chemical data quality considerations, including, but not limited to:
  - Laboratory validation;
  - Methods and materials;
  - Reporting requirements;
  - Containers and preservatives;
  - Field sampling protocols;
  - QC checks and documentation;
  - QA analysis; and
  - Data validation

Project-specific information is presented in the Quality Assurance Project Plans (QAPP) prepared for each project. Requirements for QAPP are established by EPA and summarized in EM 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans*.



g. Technical Review Process: All A-E Contractor and in-house deliverables are subject to a detailed technical review, as appropriate. The following is a description of the overall review process.

1) Design Check Review: The Design Check Review is the first step of the review process and is the evaluation of the analysis and the product documents performed by each functional discipline as an extension of the design process. Design checks shall be performed internal to the product development team (PDT) member's section. All checked drawings, computations and analyses shall be annotated to show the initials of the designer/originator and the checker. Each PDT member shall sign a certification verifying the Design Check Review(s) was accomplished. Design checklists should be used by each functional discipline to strengthen the design check process. Experience level of checker shall be commensurate with the level of complexity and risk. A design check should include an evaluation of:

- Technical Adequacy;
- Appropriateness;
- Adequacy of data;
- Completeness of documentation;
- Compliance with Federal, State, Local, and Army guidance and standards; and
- Whether any deviations from policy, guidance, and standards are appropriately identified and have the requisite approvals.

2) Interdisciplinary Review: The Interdisciplinary Review is normally the second step of the review process and encompasses the day-to-day coordination between PDT members throughout the product development process. The interdisciplinary check ensures the portion of the product developed by one discipline does not conflict or interfere with the portion developed by another discipline. Although an on-going process, it shall be formally documented in a meeting(s) prior to completion of each predetermined milestone. This is also an opportunity for each member of the PDT to review the product as a whole. Each PDT member shall sign a certification verifying that all significant conflicts between their portion of the product and that of other team members have been satisfactorily resolved.

3) Independent Technical Review (ITR): The ITR is normally the third step in the review process and provides verification that a quality product is being provided in accordance with applicable references. ITR does not include detailed checks of each PDT member's work, which is performed during the earlier steps of the review process. The ITR shall normally be performed by functional section chiefs. However, if the functional section chief is involved in the design of the product, or cannot meet the ITR schedule, then the ITR may be delegated to other senior engineers within the functional discipline, or performed by A-E Contractors, sister districts, or a combination thereof, as applicable. Each ITR reviewer shall sign a certification verifying that the ITR was accomplished. The ITR shall

ensure, as applicable:

- Technical Adequacy;
- Appropriateness;
- Adequacy of data;
- Completeness of documentation;
- Compliance with Federal, State, Local, and Army guidance and standards; and
- Whether any deviations from policy, guidance, and standards are appropriately identified and have the requisite approvals.

4) Biddability, Constructibility, Operability, and Environmental (BCOE) Review: Project deliverables that will be used as a scope for a removal action (including full designs and performance specifications) are subject to a biddability, constructibility, operability, and environmental (BCOE) review. The BCOE review process is specified in ER 415-1-11, *Biddability, Constructibility, Operability, and Environmental Review*. BCOE reviews may be performed by appropriate members of the ITR Team, i.e. Construction Branch Team Members.

5) Reviews by Centers of Expertise and HTRW Design Centers: Reviews by the HTRW Center of Expertise (Omaha), the Ordnance and Explosive (OE) Center of Expertise (Huntsville), and the NAD HTRW Design Centers (Baltimore and New England) will be conducted, as applicable.

h. Technical Guidance: The HTRW program is subject to many programmatic documents. Norfolk District maintains a library of documents/regulations for use by in-house personnel and others. Also, the Internet (<http://www.hnd.usace.army.mil/techinfo/> and <http://www.usace.army.mil/publications/>) is utilized to access documents/regulations (ERs, EMs, ETLs, ECs, EPs, etc.) and to check for new or updated documents/regulations.

**6. QUALITY ASSURANCE:** Quality Assurance reviews will be provided as an independent check that the QC process has been effectively implemented. QA reviews for both in-house, sister district, and A-E Contractor work are performed during the ITR. Federal and State regulators also participate in the QA review, as applicable. Project-specific procedures for QA review will be defined in the project-specific Work Plans and QCPs. Quality Assurance Review of Norfolk District QC/QA procedures, processes, and documentation is provided by North Atlantic Division.

**7. LESSONS LEARNED:** Norfolk District is in the process of implementing the following process. At the completion of each aspect of the project, the PE shall be responsible for preparing a “Lessons Learned” summary for the project. The “Lessons Learned” summary should address issues associated with:

- Project scope, schedule, or budget;
- Communications with team members, customer, and regulators;

- Coordination with other USACE entities and stakeholders;
- AE/ in-house team technical performance;
- Regulatory issues;
- Acquisition planning decisions; and
- Other issues associated with technical project execution.

The “Lessons Learned” will be compiled into a shared directory to maximize access by PDT members.

## **ENCLOSURE #2 ENGINEERING QUALITY MANAGEMENT SUBPLAN**

*Mission: Provide our customers with excellent engineering products with allotted execution periods and within approved budgets.*

### **ENGINEERING QUALITY MANAGEMENT PLAN COMPONENTS**

#### **1. Quality Management Assignment Rosters:**

Assigns Designer, Reviewer, and Alternate reviewer for both single- and multiple-discipline reviews. Identifies key professionals involved in the process.

#### **2. Quality Management Coordination Sheets:**

Single Discipline Review Sheets: Peer review to ensure completeness and accuracy of design criteria, assumptions, calculations, analysis, drawings, and specifications.

Multi-Discipline Review Sheets: Ensures that all work is adequately addressed and incorporated into other disciplines work. This is a cross discipline and cross Divisional review as applicable.

#### **3. Quality Assurance Report:**

- a. Narrative describing project scope, number and types of reviews.
- b. Project Assignment Rosters
- c. Review Lists

d. Review Comments and Written Responses by the Designers

#### **4. Signature Certification Sheets**

Management assurance that quality reviews have been executed and the importance of quality management stressed.

# QUALITY MANAGEMENT PLAN

## DESIGN MEMORANDUM



PROJECT TITLE  
Project Location

## Norfolk District

Technical Services Division  
Engineering Branch  
803 Front Street  
Norfolk VA 23510-1096

Project Title  
Project Location

**PROJECT OVERVIEW**

**1. PURPOSE:** The purpose of this Design Quality Management Plan is to ensure that all elements of the Design Memorandum for the *?PROJECT TITLE?* are thorough, technically excellent, and meet the needs of the non-Federal sponsor and the Federal Government.

**2. REFERENCES:** ER 1110-1-12, 1 June 1991, subject: Quality Management SOP

**3. BACKGROUND:** *INSERT PROJECT INFORMATION*

**4. CONTENT:** This Design Quality Management Plan consists of several parts. These parts are outlined below:

a. Quality Management Assignment Rosters: These rosters list the design professionals who will work together as a team to produce a quality product within budget and within schedule.

*Description of the work and identification of in-house and A/E staffs selected to perform these functions.*

b. Review Sheets: Single and Multi-Discipline Review Sheets

c. Comments and Responses:

d. Signature Certification Sheets

# Quality Management Assignment Rosters

## QUALITY MANAGEMENT ASSIGNMENT ROSTER

### EXECUTION AND QUALITY CONTROL

PROJECT: *Project Title*

LOCATION: *Location*

Project Engineer: *Name*

<u>Professional Disciple</u>	<u>Designer</u>	<u>Quality Control Reviewers</u>
		<u>Primary</u> <u>Alternate</u>

HTRW

Cost Engineering

Architectural

Structural

Mechanical

Electrical

Civil

H & H

Geotechnical

# Single Discipline Review Sheets

## CERTIFICATION OF DESIGN QUALITY SINGLE DISCIPLINE REVIEW

CENAO-TS-EC

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EC

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
Narrative				
Readability and Terminology				
Compatibility with Plates				
Technical Adequacy for DM Level				
Quantity Estimates				
Completeness All construction features				
Spot Check Quantities for Accuracy				
Appropriate Quantity Units				
Drawings				
Vertical and Horizontal geometry/control				
Compatibility with all Design Elements				



ITEM	N/A	STATUS	INITIALS	DATE
(Civil, Structural, Geotechnical)				
Adequacy of Information for DM Level				
Utility Relocations				
Symbols and Legends				
Terminology				
References				
Line Definition and Weight				
Environmental Features				
Mitigation Features				
HTRW Features				
Recreation Features				
Build ability of Features				
Specifications				
Completeness of Table of Contents				
Appropriate Edits				
Submittal Requirement Validation				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
John J. Professional Sr.  
Title  
CENAO-TS-EC

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EG

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EG

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
Boring Logs Included				
Laboratory Test Results Included				
Geologic Profiles Included				
Design Concerns Addressed Relative To: STABILITY, SEEPAGE, SETTLEMENT				
Assumptions and Design Parameters are Appropriate				
Calculations				
Seepage				
Settlement				
Stability				
Construction Materials Addressed				

Additional Comments:

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\_\_\_\_\_ Date: \_\_\_\_\_  
John J. Professional Sr.  
Title  
CENAO-TS-EG

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-ES

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-ES

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
Narrative				
Closure Structure Calculations				
Design Methodology and Approach				
Appropriate Use and Interpretation of Numerical Models				
Check of Model Input/Output				
Quantities for Cost Estimating				
Floodwall Calculations:				
Quantities for Cost Estimating				
Drainage Structure Calculations				
Quantities for Cost Estimating				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
John J. Professional Sr.  
Title  
CENAO-TS-ES

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EW

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EW

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
GENERAL:				
Does H&H analysis address customer requirements?				
Hydraulic design approach/assumptions correct?				
Does design comply with accepted standards?				
Have computer models been used appropriately?				
HYDROLOGY:				
Check mapping for changes/improvements				
Is delineation of basin correct?				
Check drainage area calculations				
Review of theoretical and historical rainfall records				

ITEM	N/A	STATUS	INITIALS	DATE
Verify routing times/frequency				
INTERIOR FLOODING:				
Check mapping for changes/improvements				
Calculation of drainage area				
Analysis and delineation of subareas				
Calculation of drainage structures and size				
Interior drainage routing analysis				
Have computer models been used properly?				
Accuracy of input/output of computer models checked?				
Were appropriate storm events used?				
Were residual flooding elevations verified and redelineated if necessary?				
Accuracy of frequency curves				
HYDRAULICS:				
Have computer models been used appropriately?				
Calibration/verification of HEC-2 model				
Topography changes accounted for in the model?				
Blockages, including debris were addressed?				
Design and overtopping profiles were finalized				
Uncertainties in Manning's n value addressed				
Superiority was addressed				
Channel modifications were addressed.				
RIPRAP DESIGN:				
Design approach and methodology				



ITEM	N/A	STATUS	INITIALS	DATE
Applicability of variables in analysis (toe elevations and velocities)				
Appropriate riprap size				
Verification of Calculations				
NARRATIVE				
Main report write-up is clear and concise				
Assumptions in H&H Appendix clearly stated				
Figures and plates clearly display analysis results				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
John J. Professional Sr.  
Title  
CENAO-TS-EW

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EG

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EG

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
NARRATIVE				
HTRW REPORT				
Statement of Purpose included				
Objectives identified				
Program or authority defined				
Physical characteristics (project area, vicinity map, planned construction activities)				
Existing data identified and assessed				
ARAR's identified				
Sampling locations described				
Sampling technique and hazards identified.				
Construction type in sampling area described				
Well construction methods and materials				

ITEM	N/A	STATUS	INITIALS	DATE
defined.				
Field screening results included				
Deviations from the work plan documented				
Equipment decontamination and handling of investigative derived waste described				
Summary of analytical results				
Regulatory requirements data				
Potential exposed populations and exposure pathways of contaminants of concern				
QA/QC sampling plan				
Construction areas requiring special handling identified.				
Construction requirements including handling during excavation, stock-pile, reuse, & disposal identified.				
Chemicals of concern identified				
Health effects of chemicals of concern				
Worker protection and engineering controls specified				
Boring Logs				
Well construction details.				
Development records				
Purging and Sampling Records				
Soil gas survey results				
Geophysical survey report				
Geotechnical test results				
Chemical Test Results/Analytical Methods				
Slug/Pumping test results				
Pertinent correspondence				
Data quality/usability				

ITEM	N/A	STATUS	INITIALS	DATE

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
 John J. Professional Sr.  
 Title  
 CENAO-TS-EG

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EM

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EM

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
CALCULATIONS:				
Site Distribution Calculations Complete				
Panel board and transformer sizing complete				
Wire sizing appears correct				
DRAWINGS:				
Existing site infrastructure accurately shown.				
Proposed modification to site accurately shown				
Details for installations and connections included?				
Proper coordination between all utilities?				
Identification of television/telephone services				
SPECIFICATIONS:				
Proper sections have been edited				

ITEM	N/A	STATUS	INITIALS	DATE
Sections are complete with submittals identified				
Sections are coordinated with other disciplines.				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
 John J. Professional Sr.  
 Title  
 CENAO-TS-EM

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EM

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EM

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
CALCULATIONS:				
Ventilation calculations complete				
Heating calculations complete				
Equipment sizing appears correct				
DRAWINGS:				
Mechanical work shown clearly				
Coordination with other disciplines				
SPECIFICATIONS:				
Proper sections have been edited				
Sections are complete with submittals identified				
Sections are coordinated with other				



ITEM	N/A	STATUS	INITIALS	DATE
disciplines.				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_ Date: \_\_\_\_\_  
 John J. Professional Sr.  
 Title  
 CENAO-TS-EM

**CERTIFICATION OF DESIGN QUALITY**  
**SINGLE DISCIPLINE REVIEW**

CENAO-TS-EA

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

Brief description of the work completed: *Enter Information*

\_\_\_\_\_  
John P. Professional, Designer  
CENAO-TS-EA

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
Architectural Features Addressed				
Coordination with other disciplines				

Additional Comments:

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This is to certify that the above documents have been independently reviewed. Drawings, specifications, and calculations were reviewed by *Insert Name*. The signature below verifies that the documents have been reviewed, comments appropriately addressed and the documents are complete and accurate as presented.

\_\_\_\_\_  
John J. Professional Sr.  
Title  
CENAO-TS-EA

Date: \_\_\_\_\_

# Multiple Discipline Review Sheets

## **CERTIFICATION OF DESIGN QUALITY** **INTER-DISCIPLINE REVIEW**

CENAO-TS-EG

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

The following signature certifies that John Q. Professional, Geotechnical Branch, has completed the inter-discipline review of the solicitation package. General review guidelines are outlined below:

\_\_\_\_\_  
John Q. Professional, Designer  
CENAO-TS-EG

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
ENVIRONMENTAL ASSESSMENT				
Project description is accurate				
HTRW ISSUES ADDRESSED				
HTRW identified on plans and in specifications				
HTRW descriptions are accurate				
COST ESTIMATE				
Project description is accurate				
Quantities are consistent with plates and quantity take-offs provided.				
HYDROLOGY AND HYDRAULICS				
Design accurately reflects hydraulics				

ITEM	N/A	STATUS	INITIALS	DATE
analysis				
Design accurately reflects interior drainage recommendations.				
Rip/Rap protection recommendations are accurately addressed in the drawings and specifications.				
SPECIFICATIONS:				
Specifications are complete and coordinated.				
DRAWINGS				
Details and plans are clear				
Adequate detail has been included to allow installation in accordance with design information				

Additional Comments:

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**CERTIFICATION OF DESIGN QUALITY**  
**INTER-DISCIPLINE REVIEW**

CENAO-TS-ES

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

The following signature certifies that John Q. Professional, Design Branch, Structural Engineering Section, has completed the inter-discipline review of the solicitation package. General review guidelines are outlined below:

\_\_\_\_\_  
John Q. Professional, Designer  
CENAO-TS-ES

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
COST ESTIMATE				
Project description is accurate				
Quantities are consistent with plates and quantity take-offs provided.				
SPECIFICATIONS:				
Specifications are complete and coordinated.				
Submittals are clearly identified				
DRAWINGS				
Details and plans are clear				
Adequate detail has been included to allow installation in accordance with design information				
Drawings reflect the conditions exhibited in the Design Analysis and Design Requirements of the customer.				

ITEM	N/A	STATUS	INITIALS	DATE

Additional Comments:

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**CERTIFICATION OF DESIGN QUALITY**  
**INTER-DISCIPLINE REVIEW**

CENAO-TS-EW

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

The following signature certifies that John Q. Professional, Engineering Services Branch, Civil Works Section, has completed the inter-discipline review of the solicitation package. General review guidelines are outlined below:

\_\_\_\_\_  
John Q. Professional, Designer  
CENAO-TS-EW

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
COST ESTIMATE				
Project description is accurate				
Special Features are Included				
SPECIFICATIONS:				
Specifications are complete and coordinated.				
Submittals are clearly identified				
DRAWINGS				
Details and plans are clear				
Adequate detail has been included to allow installation in accordance with design information				
Drawings reflect the conditions exhibited in the Design Analysis and Design Requirements of the customer.				
ENVIRONMENTAL ASSESSMENT				

ITEM	N/A	STATUS	INITIALS	DATE
H&H Information has been included correctly				
HYDROLOGY AND HYDRAULICS				
Top of protection conforms with hydraulics analysis				
Design accurately reflects interior drainage recommendations				
Riprap/toe protection recommendations are accurately addressed on the plans.				

Additional Comments:

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**CERTIFICATION OF DESIGN QUALITY**  
**INTER-DISCIPLINE REVIEW**

CENAO-TS-EC

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DOCUMENT: \_\_\_\_\_

The following signature certifies that John Q. Professional, Design Branch, Civil Engineering Section, has completed the inter-discipline review of the solicitation package. General review guidelines are outlined below:

\_\_\_\_\_  
John Q. Professional, Designer  
CENAO-TS-EC

Date: \_\_\_\_\_

ITEM	N/A	STATUS	INITIALS	DATE
COST ESTIMATE				
Project description is accurate				
Quantities are consistent with plates and quantity take-offs provided.				
SPECIFICATIONS:				
Specifications are complete and coordinated.				
Submittals are clearly identified				
DRAWINGS				
Details and plans are clear				
Adequate detail has been included to allow installation in accordance with design information				
Drawings reflect the conditions exhibited in the Design Analysis and Design Requirements of the customer.				

ITEM	N/A	STATUS	INITIALS	DATE

Additional Comments:


## Responses to Design Review Comments

## Certification Review Signature Sheets

## REVIEW CERTIFICATION

PROJECT TITLE  
PROJECT LOCATION

## MEMORANDUM FOR RECORD

1. I certify that the review process required to be performed under my responsibility has been completed and the design memorandum and recommendations met all Corps regulations, requirements, and customer expectations.

Signed:

\_\_\_\_\_  
John H. Chief P.E.  
Chief Mechanical/Electrical Section

Date

\_\_\_\_\_  
Sally F. Expert P.E.  
Chief Geo/Environ Section

Date

\_\_\_\_\_  
Robert D. Professional, R.A.  
Chief Architecture Section

Date

\_\_\_\_\_  
Harry F. Public P.E.  
Chief Engineering Support Services Section

Date

\_\_\_\_\_  
Donna K. DoWright, P.E.  
Chief Civil Works Section

Date

\_\_\_\_\_  
James C. Justice, P.E.  
Chief Civil Engineering Section

Date

---

Linda E. Records  
Chief Structural Section

Date

---

John J. Doe, P.E.  
Chief Engineering Branch

Date

Appendix C

Real Estate SubPlan

## **REAL ESTATE BRANCH QUALITY MANAGEMENT PLAN**

### **REAL ESTATE SUB-PLAN**

#### **1. Purpose**

This appendix provides the general policies and procedures for the execution of quality control activities in the Real Estate Branch, Norfolk District.

#### **2. Applicability**

2.1 This appendix applies to all activities of Real Estate Branch, Norfolk District.

2.2 The quality management process applies to all real estate services and products, including those real estate sub-products which are integral parts of decision and implementation documents developed as part of the civil works and military construction and leasing programs, including the following:

- 2.2.1. Real Estate Plans and Real Estate Planning Reports
- 2.2.2. Appraisal reports
- 2.2.3. Lands, Easements, Rights-of-Way, Relocations, and Disposal Sites (LERRD) crediting
- 2.2.4. Last Resort Housing determinations
- 2.2.5. Acquisition and disposal instruments
- 2.2.6. Inlease and outgrant instruments
- 2.2.7. Utilization and Compliance Inspection reports
- 2.2.8. Condemnation assemblies
- 2.2.9. Attorney's opinions of compensability
- 2.2.10. Physical takings analysis
- 2.2.11. Real Estate Appendices to planning and engineering documents
- 2.2.12. Executive Order Surveys
- 2.2.13. Gross Appraisal Reports
- 2.2.14. Economic Analysis
- 2.2.15. Real Estate Audits
- 2.2.16. Historical Land Use Reports
- 2.2.17. Relocation Assistance
- 2.2.18. Rights of Entry Agreements
- 2.2.19. Timber Program Management

2.3. Real Estate provides significant input to documents managed by other functional district elements.

#### **3. References**

3.1 CECG/AASA(CE) Joint Memorandum, dated 31 March 1995, Subject: Technical Review Process



3.2 CECW-A Policy Memorandum No. 2, dated 6 April 1995, Subject: Civil Works Decision Document Review -- Policy Compliance

3.3 ER 405-1-12. Real Estate Handbook

3.4 HQ USACE Real Estate Policy Guidance Letters

#### **4. Definitions**

4.1 *Design Checks and Other Internal Review Processes* Detailed review and checking carried out as routine management practices in Real Estate organizations. Such review includes checking to assure basic assumptions are valid, decisions are properly documented, and calculations are error free. These checks are performed by staff responsible for the work and shall be performed prior to conducting independent technical reviews.

4.2 *Independent Technical Review* Independent technical review by a qualified realty specialist, appraiser, or attorney. Such reviews are required reports, memoranda, and other documents that are an integral parts of Civil Works or Military project documents.

4.3 *Real Estate Project Manager* The district real estate individual assigned responsibility for guiding the development of the real estate product and coordinating with the district's other technical organizations when Real Estate Branch has final responsibility for delivery of product to the customer.

4.4 *Project Delivery Team Member* The district real estate individual assigned with responsibility for guiding the development of the real estate product.

#### **5. District Quality Control Responsibilities**

5.1 *Objective* The Real Estate Branch shall be responsible for developing and following quality control management practices and business procedures to insure the quality of real estate products and services. These objectives shall be met by development and execution of District Real Estate Quality Management Plan and Quality Control Plans.

5.2 *Quality Management Plan (QMP)* The Real Estate Branch shall establish, and update as needed, the real estate portion of the Technical Services Division's QMP which complies with the policies and principles presented in this memorandum and in applicable USACE regulations. Technical Services Division's QMP will establish the roles, responsibilities and processes of the Real Estate Branch for each major real estate function and activity.

5.3 *Quality Control Plan (QCP)* The Real Estate Branch shall prepare a Quality Control Plan (QCP) for each of the real estate products listed in paragraph 2.2 of this appendix. QCP's shall be developed which encompass all real estate aspects of each major real estate function and activity. These QCP's shall be updated as needed.

##### **5.4 Quality Control Activities**

5.4.1 *Responsibilities* The Chief of Real Estate Branch shall have overall responsibility for the technical quality of real estate products and services within Real Estate. Other subordinate managers, leaders, and individuals within Real Estate also have significant roles and

responsibilities in achieving quality products and services.

*5.4.2 Independent Technical Review* Independent technical review is applicable to only those reports, memoranda, and other documents prepared by real estate that are an integral part of a Civil or Military Works decision or implementation document. Key to the successful execution of the quality control process for the products developed by Real Estate and its contractors is the independent technical review of a product. This review shall be accomplished by real estate individuals having expertise in disciplines involved in the type of product being developed and reviewed, and who were not involved in the product development.

*5.4.3 Qualifications of Technical Reviewers* District real estate personnel who perform technical reviews must possess the knowledge, skills, and abilities to be able to identify shortcomings and deficiencies in real estate products and services, and to determine the appropriate corrective actions. Supervisory personnel may perform technical reviews, but are not authorized to perform technical review of the work of their subordinates. A copy of the technical capability profile, with a statement that the individual performing the technical review has been approved to do so, will be part of the district's QC plans.

*5.4.4 Dispute Resolution* The Chief of Real Estate Branch shall facilitate resolution of disagreements between technical reviewers and product producers within Real Estate. If this interaction does not resolve the issue, the final decision will be made by the Chief of Real Estate Branch. The Chief of Real Estate may consult with the Chief of Technical Services, who may serve as an unbiased sounding board; or major real estate technical issues may be forwarded to CENAD-ET-R for resolution or clarification.

*5.4.5 Updating of Quality Control Plans* Real Estate quality control plans shall be updated whenever significant changes occur to any element of a plan or applicable law, policy or regulations.

*5.4.6 Use of Checklists* Checklists may be used to guide the real estate technical review and ensure that critical items are not overlooked. Checklists may also be used to simplify the documentation of the review - The use of checklists in the documentation would not, however, eliminate the requirement to document specific comments or decisions.

Appendix D

Construction SubPlan

## **CONSTRUCTION BRANCH QUALITY MANAGEMENT PLAN**

### **1. Purpose**

This plan provides Technical Services Branch's annual construction quality assurance organizational operating plan pursuant to ER 1180-1-6 (Construction Quality Management).

### **2. Applicability**

This plan applies to construction activities within CENAO. Construction programs include civil works, OMA, MILCON, HTRW, FMS, WFO and SFO.

### **3. Organization**

Within CENAO, construction quality assurance is the responsibility of CENAO-TS-CQ (Quality Assurance Section). Quality Assurance Section is currently staffed by one senior lead engineer (Team Leader), one civil engineer, one mechanical engineer, one electrical engineer, one industrial hygienist, and one civil engineering technician.

### **4. Responsibilities**

CENAO-TS-CQ shall make periodic visits to District field offices to verify that Construction QA plans are in place and are effective and to conduct on-site Advice and Assistance visits. These visits are to insure that construction policies and higher authority guidance is being followed and that contractors are providing quality construction. CENAO-TS-CQ shall perform Biddability, constructibility, operability, and environmental responsibility (BCOE) reviews. This review shall be in accordance with the provisions of ER 415-1-11. CENAO-TS-CQ shall provide comments to Engineering Branch and verify that all appropriate comments have been incorporated in the construction documents and recommend issuance of the BCO certification prior to the opening of bids.

### **5. Training**

*Planning* Training Plans (including both organizational unit and individual development plans) within CENAO-TS-CQ will evaluate both technical and management training needs to assure maintenance of technical expertise and construction management expertise of construction to facilitate their quality assurance roles.

5.2 *Facilitation* CENAO-TS-CQ personnel will continue to facilitate QA training within CENAO. Emphasis during this planning period will be on continuation of HTRW Manifest Training, HTRW safety refresher training and on testing training. CENAO-TS-CQ shall have primary responsibility for ensuring that QA/QC labs are certified in accordance with established USACE and CENAD policies

5.3 CENAO-TS-CQ shall be required to maintain training matrices that display which personnel have what QA expertise within each field office.

## **6. Pre-award QA**

CENAO-TS-CQ shall participate in all Advance Acquisition Planning Conferences.

CENAO-TS-CQ shall have primary responsibility for pre-award construction QA activities including BCOE reviews, Plan-In-Hand reviews, Independent technical review Teams (ITRT), input to special contract provisions, and design review conferences. However, CENAO-TS-QA shall on occasion include participation in any of the foregoing activities on a "spot check" or as-requested basis. CENAO-TS-CQ shall evaluate the participation of District construction representatives in these activities.

CENAO-TS-CQ shall participate in project working groups as required.

## **7. Post-award QA**

Districts shall have primary responsibility for post-award QA activities including QA reporting, participation in the 3 phase inspection system, ad hoc problem solving, deficiency monitoring, QA testing, construction safety, warrantee enforcement, and schedule maintenance. However, CENAO-TS-QA shall on occasion include participation in any of the foregoing activities on a "spot check" basis. CENAO-TS-QA personnel shall provide exit briefs to responsible district personnel after any spot checks and shall include in the briefs both deficiencies noted and recommended solutions.

# Appendix E

## Operations SubPlan

## **Operations Branch Quality Management Plan**

### **1. Purpose**

The purpose of this document is to describe the plan for quality management of products prepared within the Operations Branch, Technical Services Division, of Norfolk District, U.S. Army Corps of Engineers.

### **2. Applicability**

This document applies to the preparation of survey drawings and other cartographic products, design drawings, technical reports including engineering portions of planning studies, design memoranda and other special purpose reports, contract plans and specifications, study reports, environmental assessments and impact statements. In general it only applies to products for which the Operations Branch is responsible, including those products prepared by A-E or service contract.

### **3. References**

- 3.1 ER 415-1-11, Biddability, Constructability, Operability.
- 3.2 ER 1110-X-XXXX, Engineering and Design Quality Management.
- 3.3. ER 1110-2-1150, Engineering and Design for Civil Works Projects.
- 3.4. ER 1110-2-1200, Plans and Specifications.
- 3.5. EM 1110-2-1003, Hydrographic Surveying Manual.

### **4. Policy**

It is the policy of the Operations Branch to deliver quality engineering and design services and products to our customers on schedule and within budget. The following principles will contribute to achieving this policy:

- 4.1 Quality management will be employed when developing all engineering and design services and products.
- 4.2 Continuing efforts will be made to improve quality.
- 4.3 All levels of managerial and technical personnel will be committed to quality improvements.
- 4.4 Quality engineering and design services and products will be provided at reasonable costs.
- 4.5 Engineering and design services and products will comply with USACE and customer technical criteria; industry standards; and national, state and local regulatory requirements, as applicable.
- 4.6 Customer needs and expectations will be met.

4.7 Cooperation and open communication among customers, technical and management elements will be maintained.

## **5. Definitions.**

5.1. *Quality* Conformance to properly developed requirements.

5.2. *Quality Design* A design that conforms to customer needs and expectations, and is consistent with appropriate technical criteria. An error-free design should be the goal of the designer. Realistically, however, a quality design may have minor deficiencies, provided they do not adversely affect function, health or safety, violate appropriate design criteria, and can be corrected during construction with minimal cost and schedule impact.

5.3. *Quality Management* The application of principles and procedures to obtain quality products and services on schedule and within budget.

5.4. *Quality Control* The process instituted by engineering personnel (A-E or in-house) to manage, document and obtain a specific quality product or service, on schedule and within budget.

5.5 *Quality Control Plan.* A written technical management plan for a specific technical product. For larger construction projects, the design quality control plan becomes part of the project management plan (PMP).

5.6 *Quality Assurance or Quality Verification* The process by which the organization verifies that Quality Control Plan is being applied and functioning, and that the desired service or product is being realized. Design quality verification typically includes normal design reviews, the biddability, constructability, operability (BCO) review process, and other reviews as necessary.

5.7. *Customer* The owner, user or beneficiary of a Waterways & Ports Branch service or product. For navigation projects, the definition of customer might include the local government unit (city, town or county), port authorities, pilots, terminal owners and operators, as well as individual vessel users.

### **5.8. *Quality Management of Operations Branch Products and Services***

5.8.1 *General.* The majority of products prepared by the Operations Branch are hydrographic survey drawings and/or design drawings that are prepared with the use of a CADD system. In general these drawings comprise information that is drawn from at least three sources, each of which has the potential for introducing error to the finished product or service: (1) Hydrographic survey and other data obtained in the field, (2) Pre-existing cartographic data stored in the CADD system, usually having been obtained from digitized aerial mapping data or digitized data from other existing drawings, and (3) Design and drafting data added to the drawing by the designer and drafting technician for the preparation of a specific product. Quality management of each of these three sources of data, as well as finished products, is addressed in the paragraphs, which follow.

#### **5.8.2. *Surveys***

5.8.2.1 The Navigation Support and Survey Section employs Quality Control (QC) and Quality Assurance (QA) procedures, which were developed using the Hydrographic Surveying Manual (EM



1110-2-1003, 31 October 1994) as a guide. These procedures ensure that the bathymetric and/or topographic data collected are reliable for their intended use. QC and QA begin in the field where the bathymetric/topographic data are collected and end when a final product (usually a map) is produced and reviewed.

5.8.2.2 Survey field teams follow the QC procedure established for the section, which ensures that the data being collected are reliable. Prior to the commencement of collecting data, equipment is calibrated to manufacturer's specification. After calibration is completed, various tests are performed to ensure the automated surveying system is functioning properly. If all checks to this point meet the Sections QC standards, then data collection begins.

5.8.2.3 After data have been collected, QA procedures are performed which ensure that the information collected is reliable. The Team Leader reviews and edits the data for erroneous information. After the review is completed, the survey manager performs various QA checks on the data that include, but are not limited to, comparing the new data versus historical data.

5.8.2.4 QA procedures are followed once the data are presented in a final product, usually a map. The survey manager and the Chief, Navigation Support and Survey Section review the map to ensure that all relevant information is correctly shown, and that the product conforms with surveying and mapping standards.

5.8.3 *Mapping Data* Key to the quality management of mapping data is the use of a Computer Aided Design and Drafting (CADD) system. For each navigation project, mapping data are stored in digital form in the CADD system, and are available for use in preparation of various drawings. The repetitive use of digital mapping data, for a series of surveys on a given project, e.g. Condition Survey, Plans for Dredging, Before Dredging and After Dredging Surveys, has greatly enhanced the quality of finished products by eliminating many potential sources of error. Mapping data are stored in a standard layering system, a description of which is included as an appendix to this document.

5.8.3.1 Acquisition of Mapping Data. From time to time, as existing mapping data sets become outdated, or new projects are developed through planning studies or as a result of customer requests, the Waterways & Ports Branch must acquire new mapping data. It is the policy of the Branch that whenever practicable within the limits of project schedules and funding, new mapping data requirements should be met through the services of a competent aerial mapping contractor. Quality management measures are incorporated by the contractor into the process of acquiring aerial mapping data. The data are entered into the Branch CADD system to assure they are available to technicians and engineers when needed.

5.8.4 Design and Drafting Data. During the preparation of a design or mapping product, design and drafting data are added to the drawings through the CADD station in order to display particular features essential to the product. These might include data tables, legends and notes, aids to navigation, channel design features, dredging layouts, channel cross sections, plan and section views of dredged material placement areas, dredged material placement details, existing and proposed contours, drainage structures, other civil engineering and construction requirements, real estate limits, and various other data elements. In general the Branch strives to use standard symbols and templates for added drafting features whenever possible, and a library of various features is available from which the designer and CADD technician may select. The use of standard symbols and templates aids in eliminating some sources of error. However, for non-standard, project-specific, or site-specific design and drafting features, a high degree of care must be employed by the designer and technician to control the quality of the product. In these cases

the design engineer and drafting technician should employ intermediate reviews and quality checks of the work in progress, as often as necessary to control the quality and timeliness of the work.

5.8.5 Finished Survey Drawings and Design Drawings. The types of drawings which are prepared as final finished products include but are not limited to Reconnaissance Surveys, Condition Surveys, Plans for Dredging Surveys, After Dredging Surveys, and other finished survey drawings in support of studies, engineering reports, or special customer requests. Other intermediate or working drawing type products, which are not prepared as final drawings for public use, would include Before Dredging Surveys, preliminary design drawings, etc. Finished drawings which are prepared for distribution to the public, for use as contract drawings in a set of plans and specifications, or for a particular customer, study or report, are staffed through the organization at a minimum of two stages for review and approval.

5.8.5.1 At a nearly final draft stage, approximately 90% to 95% completion, draft paper copies of all drawings are staffed through the following Operations Branch personnel for quality assurance review: cartographic or drafting technician responsible for the drawing, the survey manager responsible for the surveys used on the drawings, the chief of the Navigation Support and Survey Section, at least one civil engineering technician familiar with the project, and the responsible project engineer. Comments and required revisions are generally noted on the draft copy of the drawings. After resolution of any comments and incorporation of revisions, the drawings are approved for final preparation.

5.8.5.2 Final drawings are plotted on Mylar and staffed through the following personnel for final review and approval: Chief, Navigation Support and Survey Section, Chief, Design Section, Chief, Waterways & Ports Branch, Chief, Engineering Division, and District Engineer.

5.8.5.3 *Specifications.* Draft Guide Specifications for navigation dredging projects have been prepared in a standardized format for use on personal computer work stations with MS Word other compatible word processing software. The guide specifications are available for use by project engineers and technicians for developing specifications for a specific project. The requirements that pertain to all navigation projects are included in the standardized format. In addition, specific known optional requirements which do not apply to every project, such as those which pertain either to a particular type of dredging plant or a particular project feature, are included in the guide specifications for use as appropriate for a given project. A technician in the Operations Branch is responsible for reviewing and keeping the guide specifications up to date as the need for new or revised requirements occurs. To assure quality, periodically the technician provides the specifications to the technical design staff for review, makes any necessary revisions, and distributes updated copies of the guide specifications.

5.8.6 *Independent Technical Review of Plans and Specifications* In addition to the aforementioned procedures for quality control/quality assurance, the Operations Branch has implemented procedures for independent technical reviews. These reviews were formerly conducted at the level of North Atlantic Division and in some cases Headquarters, but are now delegated to the District for independent technical review and approval of the product. Within the Operations Branch, there are approximately six or seven non-supervisory engineering personnel who are qualified to perform technical reviews of Branch products. Assignments for technical review will be rotated among qualified personnel, based on schedule and workload. For plans and specifications, the procedures are as follows:

5.8.6.1 *New Work (Construction) Projects, Designed In-House.* At the stage of Plans and

Specifications, new projects have already received approval at the level of a feasibility study or design memorandum. Independent technical review of the navigation project plans should occur at a minimum of two stages. The first would be at a concept level, completed in sufficient detail such that the primary features of the project have been designed, such as channel and placement of dredged material, to an extent that a reliable estimate of cost can be prepared. The second would be at approximately 95% completion of drawings and completion of draft specifications, sufficiently in advance of contract advertisement such that revisions can be made prior to furnishing the final package to the Contracting Office. The package reviewed at final design level prior to advertisement, should also be furnished concurrently to the Operations Support Section for Biddability, Constructability and Operability (BCO) review. Reviewer's comments are to be provided in writing, and should be addressed or fully complied with by appropriate document revisions, prior to submission for final approval and signing of drawings. Any comments not resolved between reviewer and designer should be elevated to section chief or branch chief.

*5.8.6.2 Operation and Maintenance (O&M) Projects, Designed In-House.* For O&M projects which include new channel alignments, design and construction of confined dredged material placement facilities, or dredged material sites and/or procedures not previously used on the project, independent technical review of the navigation project plans should occur at a stage well in advance of contract advertisement. This would be at a concept level, completed in sufficient detail such that the channel realignment or placement sites have been designed to an extent that a reliable estimate of cost can be prepared. In addition, all O&M projects must undergo a final review of draft specifications and drawings, sufficiently in advance of contract advertisement such that revisions can be made prior to furnishing the final package to the Contracting Office. The package reviewed at final design level prior to advertisement, should also be furnished concurrently to Operations Support Section for Biddability, Constructability and Operability (BCO) review. Reviewer's comments are to be provided in writing, and should be addressed or fully complied with by appropriate document revisions, prior to submission for final approval and signing of drawings. Any comments not resolved between reviewer and designer should be elevated to section chief or branch chief. For O&M projects which do not differ significantly from similar maintenance dredging plans of previous years, the designer may request that final review and BCO review be conducted based on plans as advertised, and revisions made by amendment. However, if these exceptions result in the need for frequent amendments or delays to bid opening dates, final review of the project will be required in advance of contract advertisement.

*5.8.6.3 New Work and O&M Projects, Designed by Architect-Engineer Firm.* In general the procedures for review of these products have not changed. As in the past, Branch technical personnel conduct technical reviews of the A-E's products at whatever stages of completion agreed to in the contract scope of work. There should be a minimum of one complete technical review of the final product, and intermediate reviews as appropriate. For A-E products, no plans and specifications packages will be forwarded for contract advertisement without documentation of a completed technical review.

*5.8.7 Engineering Reports including Design Memoranda* To insure technical accuracy and consistent quality for engineering reports and design memoranda, these types of documents will be reviewed within the Operations Branch at both a draft and final stage. Documents will be reviewed by an in-house technical reviewer, along with appropriate routing through the project manager or technical team leader as appropriate, Section Chiefs and Branch Chief.

*5.8.8 Environmental Assessments and other Technical Documents* To insure technical accuracy and consistent quality for environmental documents, all National Environmental Policy Act (NEPA) documents will be reviewed by an in-house technical reviewer, along with appropriate routing

through the project manager, Section Chiefs and Branch Chief. The principal preparer and principal reviewer will affix signatures to the final product (NEPA document.)

QUALITY ASSURANCE PLAN

OPERATIONS SUPPORT SECTION

NORFOLK, VIRGINIA



**US Army Corps  
Of Engineers**

Norfolk District

CHIEF, OPERATIONS SUPPORT SECTION:  
WILLIAM M. STITH, III, P.E.  
DATE OF PLAN: 5 Jan 2000

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March 2000

## NORFOLK DISTRICT OPERATIONS SUPPORT SECTION QUALITY ASSURANCE PLAN

### **1. Purpose**

To establish the organizational plan for ensuring the quality of construction for all assigned construction projects.

### **2. Scope**

This plan is applicable to all Construction Quality Assurance employees regardless of status or duration of employment. A specific plan, similar to the outline attached, for each project will be developed before the Quality Assurance Coordination Meeting.

### **3. References:**

- 3.1. Construction Quality Management
- 3.2. Safety and Health Requirements Manual
- 3.3. Construction - Biddability, Constructability, Operability and Environmental Review
- 3.4. Construction Branch, Norfolk District
- 3.5. Quality Assurance Representative's Guide, Vol. 1
- 3.6. Quality Assurance Representative's Guide, Vol. 2

### **4. Definition**

Quality Assurance is the means by which the Government fulfills its responsibility in assuring that the Contractor's Quality Control (CQC) is functioning, and assures the completed product complies with the contract through reviews, inspections, and tests.

### **5. Responsibilities and Organization**

#### **5.1 Chief of Operations, Support Section:**

5.1.1 Ultimately responsible for the Quality Assurance effort for all projects assigned to the Section.

5.1.2 Supervises all section employees who in-turn will ensure that this Quality Assurance Plan is followed and that the Contractor's Quality Control organization is functioning properly on all assigned projects.

5.1.3 Recommend changes to the organization and administrative procedures to compliment and enhance the Quality Assurance mission.

5.2 Operations Support Section Contracting Officer's Representatives and administrative personnel will perform the following duties:

5.2.1 Perform Constructability Reviews.

5.2.2 Conduct Preconstruction Conference and QA Coordination Meeting.

5.2.3 Review contract plans and specifications prior to the start of work, developing the QA/QC project specific plan. Describe actions required and all Contractor's submissions needed prior to work.

5.3. Operations Support Section Construction Representatives and field Section personnel will perform the following duties, in addition to duties listed on the previous page:

5.3.1 Enforce the three-phase QC program through daily QA and Safety Inspections. Follow ER 385-1-1.

5.3.2 Attend all Preconstruction Conferences and Contractor Preparatory QA Phase. Confirm with the Contractor the type and frequency of testing to be done, procedures taken in the event of failed tests, and the frequency of testing reviews to be conducted by the Government. Insure that the Contractor has approved shop drawings and submittals before starting any new phase of work. Inform the Contracting Officer Representative whenever the Contractor is not prepared to begin a particular phase of work.

5.3.3 Attend all the Contractor Initial Phase Inspections.

5.3.4 Prepare a report of daily inspection utilizing ENG Form 2538. Record the results of all tests, inspections and deficiencies. Include comments given and received as well as all problems encountered.

5.3.5 Review all QC reports and test results to insure they are acceptable. Insure that CQC inspections have been properly conducted and recorded. Require that the Contractor resubmit unacceptable reports.

5.3.6 Observe QC tests performed when possible and all tests requiring Government observance.

5.3.7 Follow up on failed tests to insure that retesting is performed and recorded.

5.3.8 Arrange for QA testing as required to ensure contract compliance.

5.3.9 Document all major deficiencies with a Notice of Non-Compliance, NAO Form 835.

5.3.10 Follow up on all deficiency work to insure corrective action has been taken.

5.3.11 Maintain a photo log of all major features of work, including dates and descriptions of construction activities, progress photos and photos of recurring deficiencies.

5.3.12 Require CQC personnel to enforce all safety requirements. Issue an immediate stop work for life threatening safety infractions.

5.3.13 Report to the Operations Support Section Contracting Officer's Representative any potential changes or claims to the contract.

5.3.14 Advise Contracting Officer Representative of any unusual occurrence that may affect the completion of the work.



5.3.15 Monitor changed work and potential claim areas to assess labor and equipment required.

5.3.16 Review Contractor's "working" as-built drawings (a minimum of bi-weekly) to assure that they are current and clearly depict as-built conditions.

5.3.17 Check Contractor's progress payments. Agree on percentages completed and invoices for material stored on site.

5.3.18 Conduct labor interviews.

5.3.19 Enforce Safety requirements.

5.3.20 Follow guidelines in Quality Assurance Representative's Guide, Vol. 1 and Vol. 2

## **6. Standard QA Procedures**

6.1 *Design Phase* Each contract, other than dredging, shall be subject to two constructability reviews prior to formal advertisement. The first review is done at the concept stage, after the design is sufficiently complete to enable substantive comment. This review focuses on the practicality of the design from a construction standpoint. The second review is conducted at the 90% stage and ensures that all contract documents are free of ambiguities and errors. Dredging contracts shall be reviewed once at the 90% stage. Reviews shall be prepared on NAO Form 1034. Guidelines for performing the reviews can be found in, Construction - Biddability, Constructability, Operability and Environmental Review and general District guidelines are contained in the Construction Branch.

### **6.2 Preconstruction.**

6.2.1 *Quality Assurance Plan* Following award, a supplement Quality Assurance Plan may be required to this master QA plan. The supplement will address the specific QA requirements of the specific project. The Plan will identify the project, designate the Government's point of contact on QA matters and list all inspections and tests to be conducted.

6.2.2 *QC Plan* The Contractor's QC Plan is the foundation upon which the quality of work is based. The Special Clauses section of the contract normally lays out the requirements for the QC Plan. It must be received, reviewed and formally accepted before any construction begins. The Contracting Officer Representative will evaluate the Plan to insure that it is adequate and conforms to contract requirements. In addition, the Contracting Officer's representative will ensure that the Contractor's proposed testing facilities are Corps approved. Other sources of information on the QC Plan include the Corps Student Guide on Construction Quality Management and EP 715-1-2, "A Guide to Effective Quality Control".

6.2.3 *QA/QC Mutual Understanding Conference* A Preconstruction Conference is held with the Contractor as soon as possible after contract award and prior to the commencement of physical work. One portion of the conference establishes the ground rules for administering the contract. Another portion is devoted to achieving a mutual understanding with the Contractor of his role in quality control. Government and Contractor personnel who will be directly involved in quality management should be present. The Contracting Officer Representative and his Field Construction Representative shall thoroughly discuss the requirements of an effective Quality Control System. The Contractor must clearly understand the concept of the three-phase inspection program and must be made aware of the fact that no definable feature of work can begin until the preparatory phase for that feature has been completed. He must also understand that administration of the QC Plan is his responsibility and that he is responsible for all quality control activities, including those of his subcontractors and suppliers. Contractor personnel should

come away from the conference with the feeling that they will be treated fairly by Government representatives, but that strict compliance with contract provisions will be required. Comments should be provided on the Contractor's QA Plan. Detailed minutes of the conference shall be taken and a copy furnished to the Contractor.

### 6.3 Construction

#### 6.3.1 Three Phase QC Inspection.

6.3.1.1 *Preparatory Phase* The Field Construction Representative shall attend and evaluate each preparatory, ensuring that the QC Manager has thoroughly reviewed the contract requirements for that feature of work. He will also insure that the CQC has checked that all materials and equipment have been submitted and approved; provided for control testing; examined the work area to ascertain that all preliminary work has been completed; and physically examined the material, equipment and sample work to ensure that they conform to approved submittal data. All unsatisfactory inspections shall be redone prior to the start of that phase of work.

6.3.1.2 *Initial and Follow-up Phase* An Initial Phase is required at the beginning of a new operation and is intended to verify that the actual work is properly done in accordance with the procedures verified at the preparatory inspection. Unsatisfactory initial inspections will be redone. The follow-up phase is a continuous action throughout the entire time work is being performed. It involves routine checks to ensure that previously established guidelines are being followed.

#### 6.3.2 Field Documentation

6.3.2.1 *Contractor's Quality Control (CQC) Reports* The frequency for CQC reports is clearly established in the contract. Repeated delinquency shall be cause for retainage from progress payments and for adverse action against Contractor. The Project Field Construction Representative shall review each CQC report for content, requiring the Contractor to submit a supplemental CQC report for each report deemed unsatisfactory. The original report shall not be returned to the Contractor. Reasons for rejection include, but are not limited to: failure to describe work accomplished or reason for no work; failure to document weather conditions; failure to include safety meeting minutes; failure to annotate deficiencies and corrective action planned/taken; major conflicts with the QA report; failure to document phase inspections; or failure to indicate QC tests and results. (See CQC Daily Report attachment.)

6.3.2.2 *Quality Assurance Reports (QAR)*. The QAR is the Government's record of the project. It is an administrative tool as opposed to the CQC report, which is a contractual document. The Project Field Construction Representative shall prepare the QAR Daily or Weekly as determined by the Contracting Officer Representative. QA reports will be filed after they have been reviewed and initialed by the Contracting Officer Representative.

#### 6.3.3 Quality Assurance Tests

6.3.3.1 The project members must occasionally perform assurance tests to verify that the Contractor's control testing is adequate. The tests shall be accomplished by independent laboratories approved by the Corps of Engineers. Quality Assurance testing shall be performed under any of the following circumstances:

6.3.3.2 In the event that materials used in construction do not meet the contract requirements and there are no provisions in the contract for the testing of these materials.

6.3.3.3 When CQC test results indicate failure and the Contractor is reluctant to correct the area(s) that have failed.

6.3.3.4 If the Chief of Operations Support Section or the Contracting Officer Representative feels that the results of CQC testing are fraudulent, inaccurate, or questionable or when the materials being used are obviously unsuitable, contrary to previous test results.

6.3.3.4.1 The Field Construction Representatives should attempt to observe all quality control tests. The Contracting Officer Representative may call in specialized QA personnel to witness tests requiring the Government's presence. When deficiencies in workmanship and material are discovered, they will be recorded on the QA Report. Repetitive deficiencies will be reported to the Contracting Officer Representative and noted on a Notice of Non-Compliance and furnished to the Contractor. A Notice of Non-Compliance(NONC) shall be issued for repetitive deficiencies; delinquent or unsatisfactory CQC Reports; all safety deficiencies; deficiencies found by QA inspection from OCE, or NAD; or major deficiencies. The yellow copy of the NONC shall be retained by the Field Construction Representative for field reference, the pink copy shall be filed with the QAR for the day on which the NONC was issued, and the white copy given to the Contractor. The Field Construction Representative shall annotate corrective action taken on the pink copy with a reference to the QA/QC report that reports the corrective action. If the deficiency continues, the Contractor will be notified by letter that necessary actions will be taken to insure compliance with contract requirements. Intelligent, firm, and timely application of the contract provisions can be effective in enforcing CQC requirements. When withholding payment for deficient work, the quality of construction must be taken into account when determining the amount of payment to be made.

#### 6.3.4. Completion of Work.

6.3.4.1 *Prefinal and Final Inspections.* On projects where required, the Field Construction Representative shall ensure that the Contractor conducts his own completion inspection and prepares a deficiency list. Once the deficiencies are corrected, the Field Construction Representative and the Contracting Officer Representative will verify that the deficiencies are complete. If the Project is sufficiently complete, a Joint Final Inspection will be held.

6.3.4.2 *Survey.* On projects where required, in lieu of the completion inspections an after dredging survey will be required. The Contracting Officer Representative will be responsible for notifying the District Survey Section to set-up these surveys.

6.3.4.3 Contract price reduction for accepted noncompliant work. The "Inspection of Construction" clause contains a section allowing an appropriate adjustment to contract price for noncompliant work accepted in the public interest. The Contracting Officer's Representative will consult with the Ch, Operations Support Section prior to recommending to the Contracting Officer that defective work be accepted for a price reduction.

6.3.4.4 Hold retainage for lack of satisfactory progress. The "Payments Under Fixed-Price Construction Contracts" clause allows 5%-15% retainage to be withheld in any progress payment where satisfactory progress was not achieved during the subject period. For progress to be satisfactory, it must be both on schedule (including time extensions recognized) and in conformance to quality standards. Contractor noncompliance with CQC requirements may allow the Contracting Officer Representative to confirm that satisfactory progress is not being made, resulting in additional retainage.

6.3.4.5 Removing incompetent personnel under the "Materials and Workmanship" and "Superintendence by the Contractor" clauses. The Contracting Officer Representative can direct the Contractor to remove any employees deemed to be incompetent, careless or otherwise objectionable. Such recommendations should be supported by facts which show continued incompetence, carelessness, neglect or other behavior detrimental to contract performance.

6.3.4.6 *Removing incompetent or ineffective CQC personnel.* Pursuant to the "Construction Quality Management, Contractor Quality Control" section of the Special Clauses, the Contracting Officer Representative may rescind his approval of CQC personnel for documented cause. This action would require the Contractor to resubmit new personnel to fill the positions. Significant construction without a CQC representative should not be permitted pursuant to the subject contract clauses. An interim CQC representative may be accepted to avoid project delay until a permanent replacement(s) is approved.

6.3.4.7 *Stop the work under the Special Clause "Notification of Noncompliance".* The Contracting Officer may direct the Contractor to stop work on any item or work feature, pending satisfactory correction of any deficiency in that work, particularly if the defective work is to be enclosed, is to support further construction, or will become inaccessible if further work proceeds. Directives to stop should not be designated as "Stop Orders", but should cite the deficiency, the pertinent Special Clause, and direct that no further work is to be done that will interfere with the deficiency correction.

6.3.4.8 *Contractor performance appraisal.* When appropriate, the Contractor will be given a warning by the Contracting Officer Representative, stating that if he refuses to correct deficiencies in his quality control system, an unsatisfactory performance rating will be recommended. Documentation supporting such actions must be developed from the outset which calls to the Contractor's attention his deficient actions. Interim unsatisfactory appraisals should be recommended if performance has been unsatisfactory for a reasonable period of time, not to exceed 90 days at any stage of work prior to completion. The significance of this action should be explained to the Contractor as well as the exact reasons for such action.

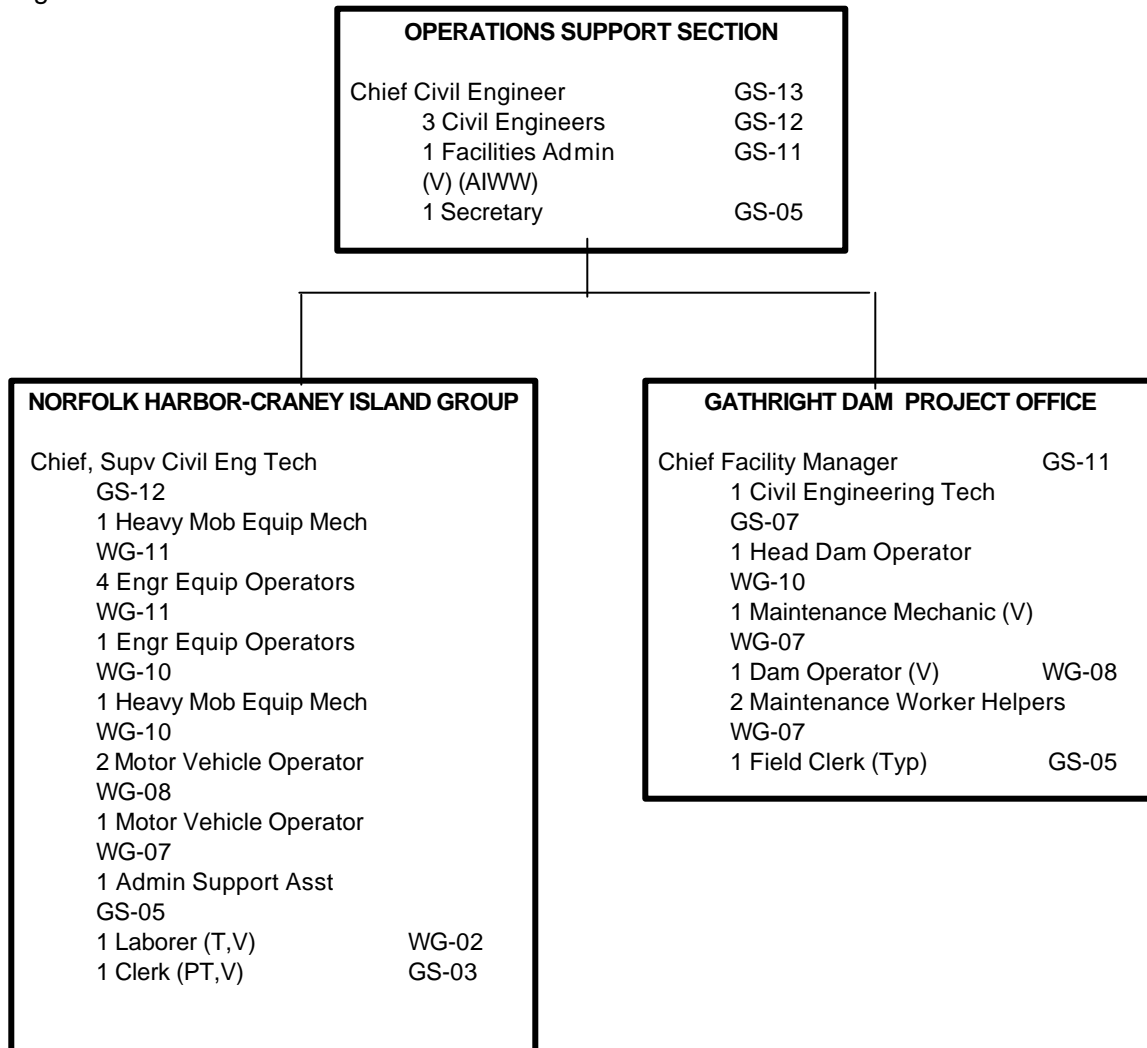
6.3.4.9 *Termination under the "Default" (Fixed-Price Construction) clause.* Termination for default is the ultimate enforcement and all actions taken should be in accordance with the requirements of the applicable contract clauses and regulations.

## **7. Training.**

Each employee of the Operation Support Section will be nominated to attend select OCE courses to supplement training and experience. In addition, when field personnel are between projects they should review Norfolk District Library Films on QA and QC.

**8** The Chief Operations Support Section may revise, alter, change, or wavier part or this entire plan due to changing conditions.

Operations Support Section  
Organization Chart



NORFOLK DISTRICT OPERATIONS SUPPORT SECTION  
SPECIFIC PROJECT QUALITY ASSURANCE PLAN

References:

1. Operations Support Sec QA Plan
2. Contract Plans and Specifications
3. Contractor Quality Control Plan
4. Contractor Safety Plan
5. Contractor Environmental Protection Plan
6. Contractor Progress Chart or NAS
7. Contractor Submittal Register
8. Pre-construction Conference Minutes
9. Contractor Quality Control Coordination Meeting Minutes (Example follows)

Project Description:

Contract Number: \_\_\_\_\_

Contract Name: \_\_\_\_\_

Contractor: \_\_\_\_\_

Original Contract Amount: \_\_\_\_\_

Date of Award: \_\_\_\_\_ NTP: \_\_\_\_\_

Completion Date: \_\_\_\_\_

Contracting Officer Representative: \_\_\_\_\_

Construction Representative: \_\_\_\_\_

Summarized Scope of Work: \_\_\_\_\_  
\_\_\_\_\_

QA/QC Requirements: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Aspects Requiring Special Attention and Actions Required (list): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contractor Submissions Required Before Starting Work (list): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Quality Control Plan  
Check List

Testing Requirements (list): \_\_\_\_\_

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Plans shall include as a minimum:

- 1) Description of quality control organization, including a chart showing lines of authority and acknowledgement that the CQC staff shall implement the three phase control system for all aspects of the work specified and shall report to the project manager or someone higher in the contractor's organization.
- 2) Name, qualifications, duties, responsibilities and authorities of each person assigned a QC function.
- 3) Copy of a letter to the QC manager signed by an authorized official of the firm, which describes the responsibilities and delegates the authorities of the QC manager.
- 4) Procedure for scheduling and managing submittals, including those of subcontractors, off site fabrication, suppliers and purchases.
- 5) Control testing procedures for each specific test. If a laboratory facility is required, the Contracting Officer will approve it.
- 6) List of all required tests.
- 7) Reporting procedures including proposed reporting formats.
- 8) A list of definable features of work.

#### EXAMPLE OF THREE PHASE SYSTEM

Preparatory - Ensure pre-dredged survey is complete, review contractor plant and equipment and review technical provisions of specifications. Ensure disposal site is in proper condition before dredging starts.

Initial - Ensure disposal site is manned and water quality test are properly performed, daily review of equipment.

Follow-up - Check post dredge surveys. Inspection of dikes at disposal site and flow of material.

#### RECORD OF PREPARATORY AND INITIAL INSPECTIONS

1. NAD Form 0-811, Record of Preparatory and Initial Phases or RMS will be used by QA representatives to record preparatory and initial inspections.
2. QA personnel shall maintain the form in a current status.

Appendix F  
Regulatory SubPlan



## **REGULATORY BRANCH QUALITY MANAGEMENT PLAN**

### **1. INTRODUCTION**

1.1 The Norfolk District Regulatory Branch mission is to administer and enforce the requirements of Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act of 1899 within the boundaries of the Norfolk District (Commonwealth of Virginia).

1.2 The day to day conduct of the regulatory program shall be in accordance with the national goals of the Regulatory Program which are listed below:

1.3 To provide strong protection of the Nation's aquatic environment, including wetlands.

1.4 To enhance the efficiency of the Corps administration of its regulatory program.

1.5 To ensure that the Corps provides the regulated public with fair and reasonable decisions.

### **2. APPLICABILITY**

2.1 This plan applies to all Regulatory Program activities at the District Level.

### **3. REFERENCES**

3.1 33 CFR Parts 320 to 329 published Federal Register Vol. 51, No. 219 November 13, 1986.

3.2 33 CFR Part 330 reissuance Federal Register, Vol. 16 No. 241, December 13, 1996.

3.3 Corps of Engineers Regulatory Program Public Service Commitment and Goals.

3.4 Regulatory Guidance Letters, letters of guidance from USACECW-OR, and relative U.S. Court decisions.

3.5 Memorandums of Agreement (MOA) between the Department of the Army and Federal agencies regarding the Regulatory Program.

### **4. REGULATORY BRANCH ORGANIZATION, STAFFING, RESPONSIBILITIES**

4.1 Regulatory Branch has a staff of 40 employees, which include environmental scientists, environmental protection specialists, and administrative staff.

4.1.1 *Chief, Regulatory Branch* Responsible for administration of the Norfolk District Regulatory Program and overall quality control of the program.

4.1.2 *Chief, Southern/North/Eastern/Western Sections* Responsible for administration of permit actions, compliance inspections, investigation of unauthorized activities and quality control of regulatory functions in specified areas.

4.1.3 *Project Managers (Environmental Scientists and Environmental Protection Specialists)*

Responsible for the quality control of permit applications evaluations, permit compliance, investigation of unauthorized activities, pre-application consultations, wetland delineations, and other special assignments relating to administration of the regulatory program.

4.1.4 *Clerical Staff* Responsible for clerical support of all permit application evaluations, permit compliance, investigation of unauthorized activities, pre-application consultations, wetland delineations, and other special assignments relating to administration of the regulatory program.

## **5. QUALITY CONTROL PROCESS**

The Quality Control process involves a series of actions to insure all work under the jurisdiction of Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act area processed in accordance with laws and regulations governing the program as cited in REFERENCES.

### *5.1. Quality Production*

5.1.1 Hire a staff of highly qualified individuals with expertise in engineering, biology, environmental science, and experience working with the public.

5.1.2 Provide staff training in PROSPECT classes, wetland classes, other applicable laws and regulations, specialized training, and continuing education at local universities and other forums.

5.1.3 Provide opportunities for staff development by encouraging participation in professional conferences, workshops, professional group meetings, Branch and Section meetings. Insure that the information flow from other Corps entities such as Headquarters, and Corps Labs is directed to the appropriate individuals.

5.1.4 Define in TAPES expected employee job performance standards and review twice yearly.

5.1.5 Recognize achievement through appropriate recognition.

### *5.2 Internal Checks and Review*

5.2.1 Enter incoming work into the Project Tracker and assign to staff as designated by Assigning Chief.

5.2.2 Follow application process in place and use existing time frame for processing work.

5.2.3 Route all outgoing work and decision documents through Section Chief, Branch Chief and other offices as applicable, e.g. Office of Counsel, Division Chief, District Engineer, etc.

5.2.4 Respond to all congressional and FOIA inquiries in a timely manner and according to internal suspense system.

5.2.5 Respond to customer telephone inquiries in a courteous and appropriate manner.

5.2.6 Use existing delegation of authority to properly process outgoing responses.

### *5.3 Performance Measures*

Regulatory performance indicators are based upon quarterly input for use in HQUSACE CMR review and for reporting to the Secretary of the Army. These standards are based on performance and numerical goals regarding permit decisions, enforcement and permit compliance, to provide a source of workload and performance information on the Regulatory Program, and are frequently requested by Congress, other agencies and non-government offices. The performance indicators used in CMR are as follows:

5.3.1 A percent of standard permits completed in less than 120 days.

5.3.2 A percent of all actions completed in less than 60 days.

5.3.3 A percent of enforcement actions resolved.

Meeting the performance measures is directly related to the budget through staffing. Regulatory activity is labor intensive and acquiring qualified staff and providing training directly affects the number of days required to assimilate information, evaluate, and make permit decisions.

#### *5.4 Management Controls and Measures*

The Regulatory Program has specific reporting requirements to headquarters and goals that need to be met. If the goals are not met a written explanation as to why they were not met is expected by headquarters. The following is a statement concerning those goals and requirements.

70-80% of all Standard Permits must be completed within 120 days.

Immediate supervisors conduct monthly reviews and examination of the Tracker Data Base by project manager to determine compliance with the stated goal and in preparation of monthly, quarterly and yearly reports.

85-95% of all actions are completed within 60 days.

Immediate supervisors conduct monthly reviews and examination of the Tracker Data Base by project manager to determine compliance with the stated goal and in preparation of monthly, quarterly and yearly reports.

20-30% of all unauthorized activities are resolved within the reporting period.

Immediate supervisors conduct monthly reviews and examination of the Tracker Data Base by project manager to determine compliance with the stated goal and in preparation of monthly, quarterly and yearly reports.

25% of all Standard Permits issued in the previous year are inspected for compliance.

Immediate supervisors conduct monthly reviews and examination of the Tracker Data Base by project manager to determine compliance with the stated goal and in preparation of monthly, quarterly and yearly reports.

At least 98% of the yearly Work Allowance is obligated.

There is a view of financial documents on a daily, weekly, monthly and quarterly basis to insure that

fiscal year projects are correct and adjustments are made appropriately.

At least 96% of the yearly Work Allowance was expended.

There is a view of financial documents on a daily, weekly, monthly and quarterly basis to insure that fiscal year projects are correct and adjustments are made appropriately.

## **5.5 Quality Controls**

5.5.1 Controversial and complex applications, pre-application consultations, jurisdictional determinations, mitigation banks and other technical and policy issues are reviewed and (dis)approved during weekly "Chiefs Meetings".

5.5.2 Section Chiefs monitor project managers' workload to ensure applications are processed in a timely manner, that all Pre-Discharge Notifications are completed with allotted time frames and Public Notices are advertised within 15 days of receipt of a complete application.

5.5.3 Section Chiefs conduct routine spot checks to ensure compliance with SOP and all regulations policies on those actions which have been delegated to the project manager level.

5.5.4 Section Chiefs require project managers to provide periodic updates to management on all controversial or longstanding enforcement actions to ensure progress towards resolution.

5.5.5 Section Chiefs periodically review project managers' workload, backlog and work complexity to ensure effective and equitable workload distribution.

## **6. QUALITY CONTROL PLANS**

6.1 Separate Quality Control (QC) Plans have been developed for each Regulatory Branch product. A list of Regulatory Branch products requiring specific QC plans is provided below, a specific QC plan for each is attached as an appendix.

6.1.1. INDIVIDUAL PERMIT PROCESS.

6.1.2. NATIONWIDE AUTHORIZATION/REGIONAL PERMITS

6.1.3. FIELD DETERMINATION OF WATERS OF THE UNITED STATES

6.2 COMPLIANCE/ENFORCEMENT INSPECTIONS.

## **7. PRE-APPLICATION CONSULTATIONS.**

## ATTACHMENT F-1

### *TYPE OF PRODUCT* INDIVIDUAL PERMIT PROCESS (STANDARD PERMITS & ASP-18's) *PROCEDURE:*

- (1) An application for a permit is assigned to Project Manager (PM) by Assigning Chief (a rotating assignment) based on level of complexity, experience of PM, specialization if any and workload.
- (2) PM reviews this application to see if it impacts a "water of the United States" including vegetated wetlands. For an Individual Permit, the application is processed in accordance with the requirements of 33 CFR Part 325("Processing of Department of the Army Permits").
- (3) Review by other elements of Norfolk District staff for specialized requirements such as Real Estate, Waterways and Ports Branch, Office of Counsel, etc. as requested by the Section Chief.
- (4) Receive all other necessary approvals prior to issuance or denial of a permit such as the State 401 Water Quality Certification or endangered species and historic resource clearances. Coordinate with other federal agencies in accordance with signed MOA's.
- (5) Prepare a Statement of Findings (SOF), FEA, 404(b)(1) guidelines analysis and FONSI to be signed at an appropriate level. These documents which will be a combination of an environmental assessment and a decision document.
- (6) Communicate to the applicant the District's preliminary decision.

### *TYPICAL DOCUMENTATION REQUIRED*

The PM will maintain a work file which shall include:

- (1) An application and sufficient information to prepare a public notice.
- (2) Copy of Public Notice.
- (3) Comments received from individuals, organizations, Federal, State, and local agencies to the public notice.
- (4) All correspondence prepared or received by the Regulatory Branch for the application, site visit reports, photographs, site inspection reports, records of conversation, and memorandums for record.
- (5) Reports for wetland delineations, or for special studies such as cultural resources, endangered species and navigation.
- (6) Signed SOF, FEA and 404(b)(1) guidelines analysis if applicable.
- (6) Permit signed by issuing officer and permittee.

## ATTACHMENT F-2

### *TYPE OF PRODUCT* NATIONWIDE AUTHORIZATIONS/REGIONAL PERMITS

#### *PROCEDURES*

- (1) Application for a permit is assigned to Project Manager by Assigning Chief.
- (2) Project Manager reviews application to see if the project affects a "water of the United States", including vegetated wetlands.
- (3) Evaluates avoidance, minimization and mitigation measures proposed by applicants
- (4) Prepares an appropriate Nationwide permit authorization in accordance with 33 CFR Part 330, or a Regional Permit in Accordance with 33 CFR Part 325.
- (5) For Nationwide permit authorizations requiring pre-construction notifications (PCN), the Project Manager shall contact the appropriate coordinating agencies using a PCN notice to seek their views.

#### *TYPE OF DOCUMENTATION REQUIRED*

The Project Manager shall maintain a work file which shall include:

- (1) An application with sufficient information to process the action.
- (2) All correspondence prepared or received by the Regulatory Branch for the application, photographs, site inspection reports, records of conversation, decision documents and memorandums for record.
- (3) Reports for wetland delineations, special studies such as cultural resources, endangered species.
- (4) Copy of Nationwide or Regional Permit authorization letter.

ATTACHMENT F-3

*TYPE OF PRODUCT* FIELD DETERMINATION OF "WATERS OF THE UNITED STATES"  
INCLUDING VEGETATED WETLANDS

*PROCEDURES*

- (1) Project is assigned to a Project Manager by the Assigning Chief.
- (2) A determination is made in accordance with the requirements of 33 CFR Part 328 (Definitions of Waters of the United States).
- (3) Wetland determinations or delineations are made in accordance with the procedures described in the currently prescribed Corps of Engineers Wetland delineation Manual. These procedures are to be done only by personnel who have received appropriate training in the 1987 Wetland Delineation Manual.
- (4) The results of the determination are communicated to the applicant.

*TYPICAL DOCUMENTATION REQUIRED*

The project Manager shall maintain a work file which shall contain:

- (1) Site inspection/site visit reports, photographs, wetland delineations submitted by third parties or performed by the Corps (including data sheets), records of conversation, memorandums for record, and meeting rosters.
- (2) Any correspondence prepared concerning the determination of the extent of the "waters of the United States."

## ATTACHMENT F-4

### *TYPE OF PRODUCT* COMPLIANCE/ENFORCEMENT INSPECTIONS

#### *PROCEDURES*

Field inspection of project sites is done to determine compliance with issued Permits. Enforcement actions are done to determine if work performed in "waters of the United States" has received a permit.

(1) Project is assigned to a Project Manager by the Assigning Chief.

(2) This project is processed in accordance with the requirements of 33 CFR Part 326. Voluntary restoration is pursued as the best option.

(3) Action may be forwarded to Office of Counsel or referred to the US Environmental Protection Agency (USEPA) in accordance with the 1989 Memorandum of Agreement on Enforcement between the Corps and the USEPA.

#### *TYPICAL DOCUMENTATION REQUIRED*

The project Manager shall maintain a work file which shall contain:

(1) All site visits reports, photographs, records of conversation, memorandums of record, Meeting roster.

(2) All correspondence prepared or received by the Regulatory Branch for this action.



## ATTACHMENT F-5

### *TYPE OF PRODUCT* PREAPPLICATION CONSULTATIONS

#### *PROCEDURES*

Inquiries are received from property owners or prospective permittees requesting the Corps to advise them of the need for a permit as well as pertinent issues that must be addressed and resolved.

(1) Project is assigned to field or District Office staff by the Assigning Chief.

(2) The project is reviewed in accordance with 33 CFR 325.1(b). Site or office meetings are arranged to determine extent of Corps jurisdiction and evaluate all appropriate and practicable means to avoid and minimize impacts to the aquatic environment. Also potential impacts to navigation, federally listed threatened and endangered species, and cultural resources are discussed. Based on discussions, prospective applicants are provided advice on how to address probable impacts so that all regulatory requirements are met. This process takes advantage of most individuals' interest in resolving problems before considerable time and money are spent unnecessarily.

#### *TYPICAL DOCUMENTATION REQUIRED*

The project manager shall maintain a work file which shall contain:

(1) All site visits, meetings, reports, photographs, records of conversation, wetland delineations or determinations, and memoranda for the record.

(2) All incoming and outgoing correspondence concerning the property.